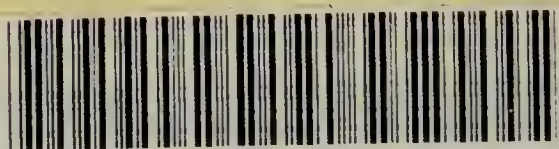




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GARDNER'S
HOUSEHOLD MEDICINE



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GARDNER'S
HOUSEHOLD MEDICINE
AND
SICK-ROOM GUIDE

A DESCRIPTION OF THE MEANS OF PRESERVING HEALTH
AND THE TREATMENT OF DISEASES, INJURIES,
AND EMERGENCIES

THIRTEENTH EDITION

REVISED AND EXPRESSLY ADAPTED
FOR THE USE OF FAMILIES, MISSIONARIES, AND COLONISTS
BY

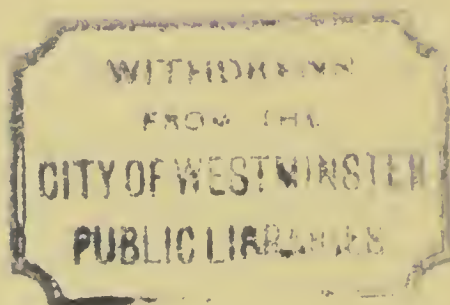
W. H. C. STAVELEY, F.R.C.S. ENG.

WITH NUMEROUS ILLUSTRATIONS

LONDON
SMITH, ELDER, & CO., 15 WATERLOO PLACE
1898

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PREFACE

THE first edition of this work, written by the late Dr. John GARDNER, was published in the year 1861. He aimed at providing the non-professional reader with a book which, without encroaching on the proper provinces of a physician or surgeon, would enable him to recognise the more common diseases, and indicate a line of treatment which could be safely carried out.

The fact that his work has gone steadily through twelve editions proves that it has met a real need.

The Editor of the present edition, who has been entrusted with the revision of the work, has ventured to make some alterations which he trusts will add to its usefulness, but from first to last he has kept Dr. Gardner's aim in view, that the book should aid and not supersede the services of a medical man. It is hoped, in the first place, that it may prove useful to all who from any cause are unable to obtain prompt medical aid; and, secondly, that it may lighten the labour of the doctor in giving directions as to treatment, and may help the patient to carry them out effectually.

In the book, as it is now issued, the more important elements of Anatomy and Physiology are first briefly described, and subsequently the means of preserving health are dealt with at some length. It is true that an excessive anxiety as to the preservation of health may induce a morbid mental condition which is more irksome than actual ill-health. We are, however, liable to acquire bad habits from ignorance, or

thoughtlessness, and we can, with but little trouble, adopt a manner of living which materially influences the happiness both of ourselves and those around us.

In the treatment of disease, an endeavour has been made to emphasise the importance of nursing and proper diet. If the administration of medicines may appear to be treated somewhat too briefly, it is not because the writer is an unbeliever in their efficacy, but because they should be regarded as auxiliaries to treatment; and we must remember that many drugs are double-edged weapons, which, unless skilfully handled, may cut in a direction not intended.

The selection of treatment for disease in a book on Household Medicine is by no means an easy matter. Some forms of treatment, though free from risk in skilled hands, must be so surrounded by reservations that it is impossible to describe intelligibly how they may be used with safety by the ordinary reader. Great care has been exercised in selecting methods of treatment which can be safely employed, and an attempt has been made to show when they may be used, and to describe the symptoms which imperatively call for skilled help. In some cases the treatment has been carried to a point which would certainly be unwise if it were possible to obtain the services of a doctor. This is done for cases of disease or injury such as may be met with by missionaries, colonists, and expeditions in search of game, when far from skilled help.

It must be clearly understood that the treatment described is, in very many cases, not the best form of treatment known, but is the one which can be safely used with a good prospect of success. This is particularly the case in dealing with injuries such as fractures and dislocations.

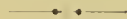
The list of medicines may appear to be unnecessarily long. It is true that several medicines producing the same results are included; but this has been done because the occasion may arise when one is at hand and another cannot be obtained. In the Appendix will be found suggestions for the medicines most

likely to be wanted in the nursery, in a large household, or by shooting expeditions.

The reader will doubtless note many omissions in the following pages, some of which are intentional. The treatment of tumours has been omitted for definite reasons. It is always of importance that the nature of a tumour should be recognised as early as possible, and this can only be done by a skilled observer. There are very few varieties which can be cured by either internal or external remedies, and valuable time may be irrevocably lost in attempting to deal with them with household applications. Some diseases, such as lock-jaw and hydrophobia, as it occurs in man, are not described, owing to the vain apprehensions which might be aroused, and the impossibility of recommending any form of treatment likely to prove beneficial.

W. H. C. S.

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PART I

ANATOMY AND PHYSIOLOGY

CHAPTER I

A GENERAL DESCRIPTION OF THE STRUCTURE AND FUNCTIONS OF THE BODY

The Skeleton—The Joints—Muscles and Tendons—The Brain and Nervous System—The Blood and Vascular System—The Lungs and Respiration—Digestion and the Digestive Apparatus—The Heat of the Body—The Organs of Excretion—Ductless Glands—The Organs of the Special Senses—The Eye—The Ear—The Organ of Voice—Smell and Taste.

HE who would lend intelligent aid to the human frame when injured or diseased must possess some knowledge of it as it exists in health. He must know something of the skeleton, the framework of the body; of the muscles, by which movement is produced; of the nervous system, the source whence come the impulses to move; of the circulation, which carries the blood to and from the tissues; of the air we breathe, and how and why we breathe; and why we require food and how it is digested.

The human body may be compared to a steam-engine. In order that they may work three things are essential to both—(1) Food or fuel. (2) Water. (3) A gas called oxygen, which exists in the surrounding air. They both produce whilst at work—(1) Energy in one form or another. (2) Heat. (3) Both discharge certain waste matters, the products of combustion, though in a somewhat different form.

PRODUCTS OF COMBUSTION	THE BODY	THE ENGINE
Watery vapour	in the form of vapour from the lungs.	in the form of steam.
Carbon.	Carbonic acid gas from the lungs.	Carbonic acid gas and carbon in the form of soot.
Undigested and unburnt constituents of food and fuel.	Fæces.	Cinders.

As a result of the combustion of animal food, the body also produces a substance called *urea*.

The body is protected externally by the skin and supported by the skeleton. Beneath the skin is a layer of fat of varying thickness, enveloping the deeper structures and filling up the intervals between them.

The limbs are mainly composed of muscles, which more or less completely envelop the bones, and in the intervals between the muscles run the blood-vessels and nerves. The chest contains the heart and lungs; the abdomen contains the organs of digestion and excretion.

The organs enclosed in the chest and abdomen are, for the most part, covered with a thin glistening tissue (*serous membrane*), which secretes a clear fluid in sufficient quantity to lubricate the surface and prevent friction.

The cavities and passages within the body which communicate with the exterior are lined with *mucous membrane*. This becomes continuous with the skin at the orifices of the body. Thus the mucous membrane of the digestive tract is continuous with the skin round the lips, lines the mouth, the gullet, the stomach, and the intestines throughout their length, and finally blends with the skin at the posterior orifice of the body.

THE SKELETON

The bones, forming the skeleton, support the soft parts of the body, form protecting cases for important organs, and, as levers acted on by muscles, produce movement. All the bones are covered by a membrane called *periosteum*, full of small vessels which carry blood to nourish the bone. The surface of a bone which comes in contact with and moves on another at a joint, is covered with a thin layer of smooth, glistening cartilage.

The skull.—The vault and face are formed by numerous bones closely united together, the lower jaw alone having a movable joint. The rounded upper part, the *cranium* (fig. 2, 1), forms a strong protecting case to the brain. Its strength lies in its rounded shape and numerous thick buttresses of bone

which support its sides and base. In front are the cavities for the eyeballs (*orbits*, fig. 2, 2), and between and below them

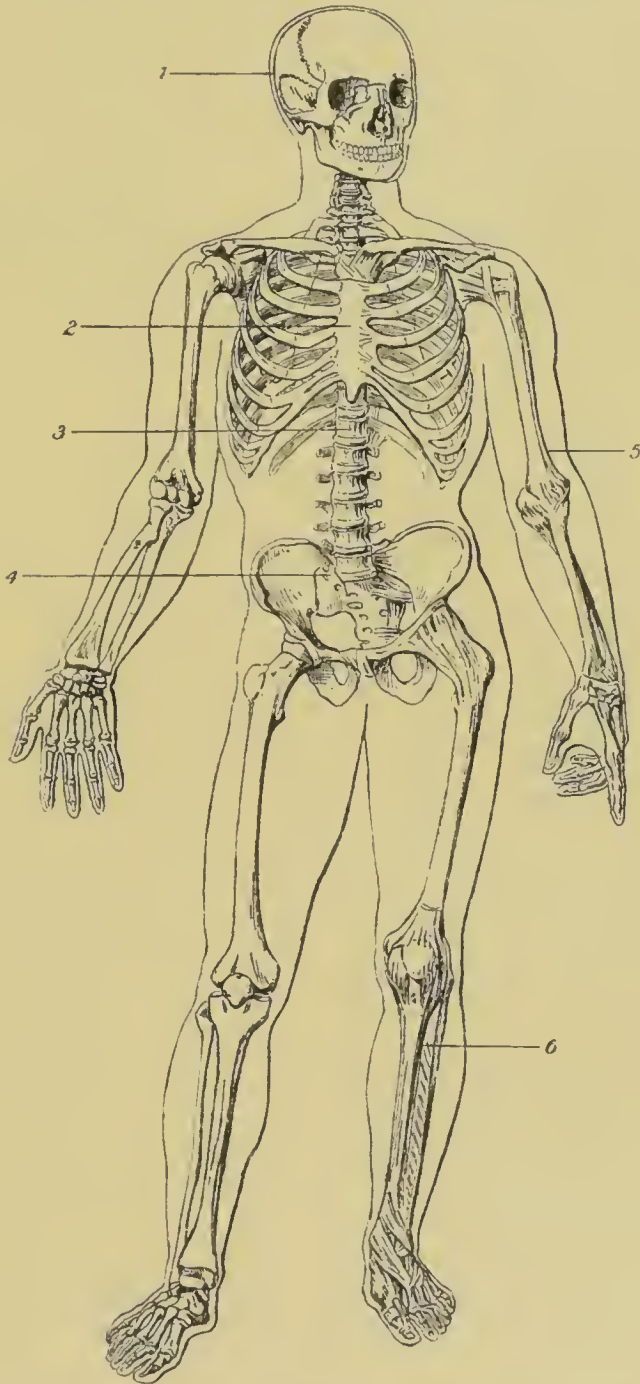


FIG. 1. —THE SKELETON.

The ligaments binding the bones together are shown on the left arm and leg.

1. The skull. 2. The chest or thorax. 3. Spine. 4. Pelvis. 5. Upper limb. 6. Lower limb.

is the nose cavity, divided into two by a vertical partition (fig. 2, 3).

On each side are round bony canals leading to the organs of hearing, and underneath numerous apertures are found for the

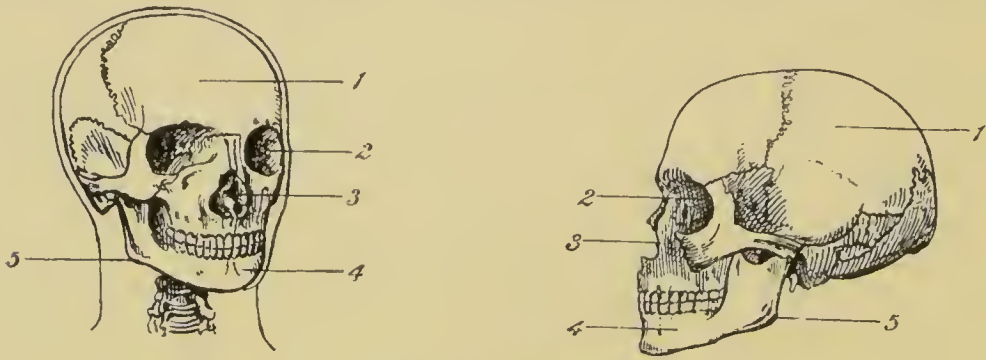


FIG. 2.—THE SKULL.

1. The cranium. 2. Orbit. 3. Nasal cavity. 4. Lower jaw. 5. Angle of the jaw.

ingress and exit of nerves and blood-vessels, including one especially large for the continuation of the brain into the spinal cord.

The lower jaw (fig. 2, 4) forms the chin in front and is shaped like a horseshoe. Behind it turns upwards on each side, forming the 'angle of the jaw' (fig. 2, 5), and joins the skull by means of a freely movable joint just in front of the lobe of the ear.

The skull is supported by the vertebral column, or spine, considerably behind its centre of gravity, so that the head nods forward when the muscles are relaxed; which most people have experienced on dropping off to sleep with the head unsupported.

The spine or vertebral column consists of twenty-four separate vertebræ with discs of cartilage between each, strongly united, but allowing of a certain amount of movement. The spine is not straight, but has three curves; the first, in the region of the neck, forward; the second, in the upper and middle parts of the back, backward; the third and lowest, forward like the first. This arrangement prevents the spine from being a rigid column, allows of spring, and so breaks any force transmitted either from above or below. In each vertebra is a large vertical aperture, so that when they lie one above the other, the whole spine forms a strong but flexible bony tube, the *spinal canal*, through which runs the spinal cord, giving off nerves through apertures between each vertebra.

The pelvis (fig. 3, 1). —The spine below joins a pyramidal shaped bone, the *sacrum*. This is firmly wedged in between and united to the two haunch-bones—*innominate bones*—which curve round and meeting form a bony arch in front, the *pubes*. These three bones thus form a strong ring, enclosing an irregular

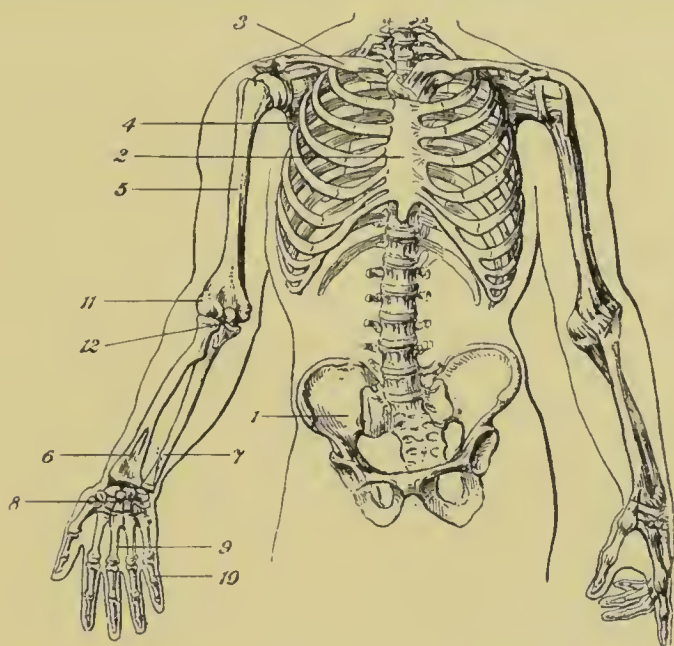


FIG. 3.—THE PELVIS, THORAX, AND UPPER LIMB.

1. The pelvis. 2. Breast-bone or sternum. 3. Collar-bone or clavicle. 4. Shoulder-blade or scapula, seen behind the ribs lying on the back of the chest. 5. Humerus. 6. Radius. 7. Ulna. 8. Wrist or carpus. 9. Metacarpus. 10. Phalanges. 11. External condyle. 12. Internal condyle. The right hand is supinated, the left pronated.

basin-shaped cavity, from which the name ‘pelvis’ is derived. The sacrum has attached to its lower end the small rudimentary tail-bone, the *coccyx*.

The pelvis supports the intestines and affords protection to the urinary bladder, lower bowel, and other organs. On the outer side of each haunch bone is a deep cup-shaped depression which receives the rounded head of the thigh-bone.

The chest or thorax (fig. 1, 2) is formed by the spine behind, the breast-bone (*sternum*, fig. 3, 2) in front, and the ribs on each side. The ribs are attached to the spine by joints and to the breast-bone by means of intervening cartilages; they are long, springy bones which, though almost fixed both in front and behind, permit of considerable lateral movement, thus allowing the cavity of the chest to increase both from side to side and from before backwards in the act of breathing. The

chest contains the heart, lungs, lower part of the windpipe, the gullet as it passes down to the stomach, and numerous nerves and large blood-vessels.

The upper limb is made up by the collar-bone (*clavicle*, fig. 3, 3); the shoulder-blade (*scapula*, fig. 3, 4); the upper arm bone (*humerus*, fig. 3, 5); the two bones of the forearm (*radius*, fig. 3, 6, and *ulna*, fig. 3, 7); and the wrist and hand.

The bones forming the shoulder are arranged so as to permit of a wide range of movement. The collar-bone lying in front is attached by its inner end to the top of the breast-bone—the only true joint connecting the arm with the body, and by its outer end to a strong prominence of the shoulder-blade which lies on the back of the chest. The shoulder-blade is triangular in shape, and glides on the chest wall according to the movement of the arm. It is really a shifting fulcrum against which the arm acts, and is fixed at the exact position required by the strong muscles which connect it with the spine and chest wall.

The collar-bone supports the arm, giving squareness to the shoulder, and protects important nerves and blood-vessels which pass under it to the arm.

Under the bony prominences of the shoulder-blade is a large, slightly hollowed surface, against which the rounded head of the upper arm bone (*humerus*) rests. This is a ball-and-socket joint, but in order to allow free movement, the size of the ball is out of proportion to the depth of the socket, strength being sacrificed to some extent for free movement.

The lower end of the humerus is broad and flattened into two knuckle-like projections of bone, the *internal* and *external condyles* (fig. 3, 11 and 12), and enters into the formation of the elbow joint, being received by the two pincer-like prominences of the inner¹ of the two bones of the forearm (*ulna*, fig. 3, 7). The outer bone of the forearm (*radius*, fig. 3, 6) has a small rounded head which is bound to the ulna near the elbow by a noose-like ligament in which it twists during the movements of supination (turning the palm up) and pronation (turning the palm down). The lower end of the radius is broad and strong, and receives the bones of the wrist, the small lower end of the

¹ *I.e.* looking at the forearm and hand with the palm up (supinated), the ulna is on the inner or little finger side, the radius on the outer or thumb side.

ulna being bound to its inner side. This arrangement insures any force applied to the hand being distributed, and prevents it being directly transmitted up the arm. For instance, when a blow is given with the fist, the shock is received by the hand and wrist, and passed on to the radius, which passes it on to the ulna, which transmits it through the elbow joint to the humerus, and thence to the shoulder. There are eight small bones in the wrist (*carpus*, fig. 3, 8), arranged in two rows. From these spring the five bones of the hand—*metacarpal bones* (fig. 3, 9), one for the thumb and each of the four fingers.

Each finger contains three bones (*phalanges*, fig. 3, 10), the thumb only two.

The lower limb is composed of the thigh-bone (*femur*, fig. 4, 1); the knee-cap (*patella*, fig. 4, 2); the two bones of the leg (*tibia*, fig. 4, 3, and *fibula*, fig. 4, 4); and those of the foot.

The *femur* is a long, very strong bone. The head is of globular shape, and is received in the deep cup-shaped depression of the haunch-bone. This is a very perfect ball-and-socket joint, strength being secured at the expense of a wide range of movement. The head is set upon an oblique neck which runs down and out to be continuous with the shaft. At the junction of the neck and shaft on the outer side is a large mass of bone—the *great trochanter* (fig. 4, 5), for the attachment of numerous strong muscles. This is an important bony landmark to the surgeon in examining injuries in the neighbourhood of the hip-joint. The lower end

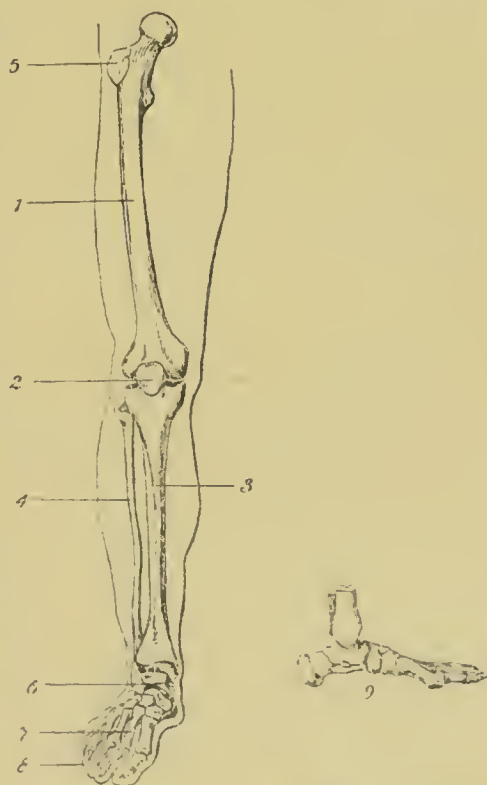


FIG. 4.—THE LOWER LIMB AND FOOT.

1. Thigh-bone or femur. 2. Knee-cap or patella.
3. Shin-bone or tibia. 4. Fibula. 5. Great trochanter. 6. Tarsus. 7. Metatarsus. 8. Phalanges. 9. Side view of the inner side of left foot showing the bony arch.

of the femur broadens out into two knuckles which rest on the broad upper surface of the inner of the two bones of the leg (*tibia*, fig. 4, 3); two semicircular cartilages being interposed like washers, which break any shock transmitted through the joint.

The *knee-cap* (*patella*, fig. 4, 2) is a rounded bone, flattened on the under surface, which rests upon the lower end of the femur. It is embedded in a strong tendon, and acts as a shifting fulcrum, giving greater power to the muscles which straighten the leg on the thigh. It also protects the front of the knee-joint.

The bones of the leg, like those of the forearm, are two in number, but are immovably bound together. The inner bone, shin-bone (*tibia*, fig. 4, 3), is much the larger and stronger, the outer bone (*fibula*, fig. 4, 4) being comparatively slender and weak. The lower ends of these two bones together form an arch which receive the bones of the instep. The instep (*tarsus*, fig. 4, 6) is composed of seven bones, one placed like a key-stone receiving the weight of the body from the tibia and fibula, the others, together with the five bones of the fore part of the foot (*metatarsus*, fig. 4, 7), forming an arch.

Like the thumb, the big toe has two *phalanges*, the other toes three each.

THE JOINTS

The surfaces of bones which enter into the formation of a joint are held together by strong white fibrous tissue. This, in some cases, as in ball-and-socket joints, completely surrounds the joint, forming a capsule. In others, it forms strong bands at the sides of the joint; and again, as in the knee, we find them inside the joint. These bonds of union are called **ligaments**. The interior of all joints is lined by a delicate membrane called **synovial membrane**, which secretes a somewhat oily fluid to lubricate the joint. The amount secreted in health is only sufficient to keep the interior of the joint moist, but when injured or diseased it often secretes so much fluid as to distend the joint.

MUSCLES AND TENDONS

Muscles.—On removing the skin of the body and a layer of fat which varies in thickness in different individuals and in various regions of the body, we see red flesh covered by a sheath of fibrous tissue. This red flesh is **muscle**, and the fibrous sheath is called **fascia**. The peculiar characteristic of muscle is its power of shortening and becoming thick (contracting) when influenced by the will and certain other causes, and of returning to its original form (relaxing) when the need for contraction is over.

There are two varieties of muscular tissue in the body: (1) **voluntary muscle**; (2) **involuntary muscle**. Voluntary muscle is so called because contraction is brought about by the will through the agency of nerves. All muscles acting on the bones are formed of it. We are so much in the habit of using these muscles that we are almost unconscious of their presence unless overworked. Voluntary muscles are of various forms: some long, flat, and riband-like; others rounded masses; others, again, forming broad, flat, fleshy sheets. Muscles are said to 'arise' or 'take their origin' from one point, and to be 'inserted' at another, the attachment to the more fixed point being the 'origin,' that to the more movable bone the 'insertion.' When the muscle contracts these two points are brought closer together, and movement is produced (fig. 5). Some muscles arise

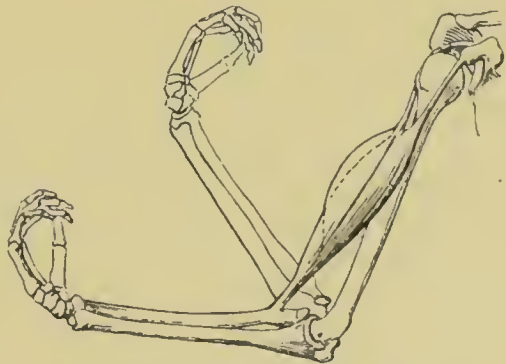


FIG. 5.—THE ARM AND BICEPS MUSCLE.

Showing the contraction and alteration in shape of the biceps muscle of the arm, causing flexion of the forearm.

as fleshy fibres from a bone and are inserted into another directly as fleshy fibres. Others arise from a bone as a fleshy mass (the belly of a muscle), and terminate in strong, white fibrous bands called **tendons**.¹ A familiar example of this are the muscles of the calf, which arise from the thigh and leg

¹ The term 'leaders' is popularly used for tendons.

bones and terminate in a strong tendon (the *tendo achillis*), to be inserted in the bone of the heel.

When a tendon or muscle lies in contact with a bony prominence, there is usually a small pouch interposed, lined with membrane resembling synovial membrane to prevent the tissues being injured by friction. Such a pouch is called a **bursa**. These also exist between the skin and bone at the elbow and knee.

Involuntary muscle is so called because it is uninfluenced by the will, but acts in response to certain nervous impulses quite apart from any wish of our own. This variety of muscle does not act upon the limbs, but forms part of vital organs, the working of which it is all important should be carried on independent of our will, awake or asleep. The heart is composed almost entirely of such muscle. The arteries have their coats largely composed of it, regulating the size of the tube, and consequently the amount of blood according to the requirements of the tissues. The coats of the stomach and intestines are partly formed of it, and by its contractions the food is mixed up and passed on during the process of digestion.

THE BRAIN AND NERVOUS SYSTEM

No movement can take place without the contraction of a muscle; no muscle can contract, nothing can be seen, heard, or felt except through the agency of nerve tissue.

We may compare the nervous system to a telegraphic system. The brain is the central office with various special departments in immediate connection with headquarters. From here there are lines of communication with branch offices which directly transmit some messages to and from the central office; others are elaborated before being passed on, others again are directly dealt with by the local managing body.

The brain is composed of two parts, the large brain (*cerebrum*, fig. 6, 1), the seat of will and intelligence, and the small or hind brain (*cerebellum*, fig. 6, 2), for the regulation of our movements, both situated in the skull. The spinal cord is a prolongation of the brain, and is contained in the spinal canal. Within the skull, the junction of the brain with the upper part

of the spinal cord forms a rounded body, the *medulla oblongata*. This structure and the adjoining portion of the spinal cord teem with the most important functions to our existence, such as the regulation of the heart and of breathing. Injuries to the brain

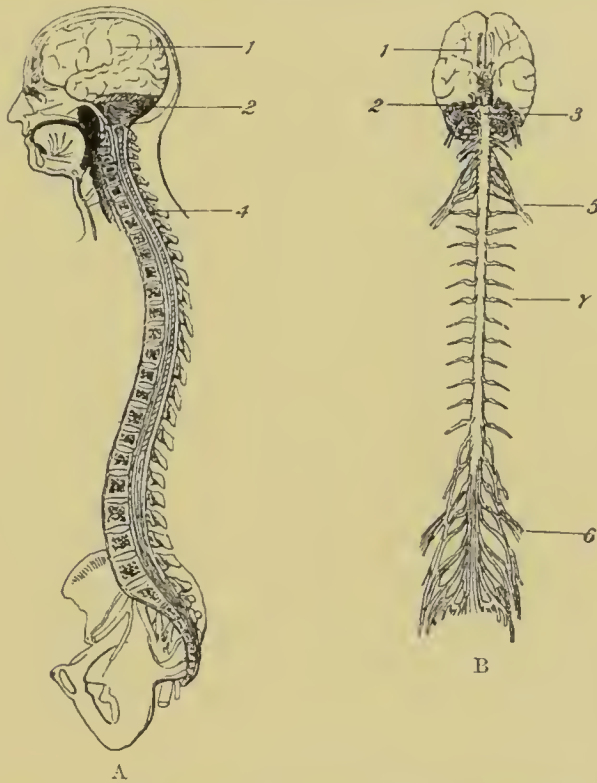


FIG. 6.—THE BRAIN, SPINAL CORD, AND NERVES.

- A. Showing the brain in the skull, and the cord lying in the spinal canal.
 B. The brain and spinal cord seen from the front. The brain is somewhat tilted back to show the under surface.
 1. Cerebrum. 2. Cerebellum. 3. Medulla oblongata. 4. Spinal cord. 5. Branches to upper limb. 6. Branches to lower limb. 7. Branches to walls of chest and abdomen. These branches are cut short.

itself, though grave, may possibly be recovered from; any injury to the medulla oblongata causes instant death.

The spinal cord is not of uniform thickness, but bulges out at points whence issue the nerves to the limbs. There is an enlargement situated in the neck giving off nerves to the arm, and containing groups of nerve cells which elaborate messages sent down from the brain and up from the arm. There is another enlargement opposite the attachments of the last two ribs performing the same offices to the lower limb, and also containing groups of cells regulating the urinary bladder and lower bowel.

From the brain and spinal cord throughout its course nerves

are given off which contain two sets of fibres, one set carrying impulses downwards, principally to the muscles (*motor nerves*), the other set carrying messages upwards (*sensory nerves*). These fibres are originally bound together, forming mixed motor and sensory nerves, but the farther they get from the centre the finer they become, and branching off are at last either sensory or motor nerves. For example, the great nerve at the back of the thigh is originally formed by the union of several large trunks coming from the spinal cord, joining and forming one large band as thick as the forefinger. If this band were cut across the leg and foot would become paralysed and dead to all sensation.¹ But this great nerve soon divides into two, and subdivides again and again until it forms quite small filaments, some supplying the muscles, others carrying sensations of pain, heat, cold, and the like, from individual toes.

The course the nerve fibres take in the brain and spinal cord is of great interest and importance. They cross over from one side to the other. The motor nerves from the right side of the brain cross over in the medulla oblongata, and running down the left side of the spinal cord supply the left side of the body. The sensory nerves from the left side of the body cross over immediately they enter the spinal cord, and, running up the right side of the cord, reach the right side of the brain.

The result of this is that if one side of the brain is damaged, the paralysis occurs on the opposite side of the body.

In close connection with the brain and spinal nerves is another nervous system called the **sympathetic system**. This is an infinitely finer and more complex system, the branches communicating and inter-communicating with one another, and certain collections of nerve-cells called *ganglia*, which are for the most part situated in the neighbourhood of internal organs, and these again with other minute collections of cells in the substance of the organs themselves. The main function of this system is to regulate the blood supply to muscles and other tissues by acting on the muscular coats of the arteries, causing them to contract or dilate, and so to partially shut off or increase the blood supply. For instance, when a man is taking active muscular exercise, much blood is required by the muscles, but

¹ With the exception of the inner side of the foot and leg, which is supplied with sensation by another nerve.

little by the digestive organs, and the blood is accordingly partially shut off from the intestines, and a large quantity supplied to the muscles. After the exercise a meal is taken, and now the muscles being at rest the blood is largely shut off from them and supplied in greater quantity to the organs of digestion. This, together with many other subsidiary functions, is effected by the sympathetic system.

THE BLOOD AND VASCULAR SYSTEM

Blood is a fluid constantly moving in the living body, but which on being shed clots in a few minutes. Seen under the microscope, it is composed of minute, pale yellow, circular discs (*corpuscles*) floating in fluid (*liquor sanguinis*). These corpuscles (called **red corpuscles**) possess the power of absorbing oxygen from the air for the purpose of combustion by the tissues of the body. When loaded with oxygen and seen *en masse* they give the blood its bright red colour; when they have yielded up their oxygen they make the colour of the blood a dark purple. Besides these coloured corpuscles there are others considerably larger, but far fewer in number, and quite colourless. These are largely concerned in the clotting of blood when shed, and in the process of healing in damaged tissues. They are called **white corpuscles**. The *liquor sanguinis* is an almost clear fluid, and conveys to the tissues certain substances for their combustion or nutriment. It has also the power of absorbing the products of their combustion, *i.e.*, certain waste materials, the more important of which is carbonic acid gas. It gives up this gas to the air on reaching the lungs, and conveys the other waste products to certain organs called glands (such as the kidney), which have the power of excreting them.

Thus we see that the blood carries oxygen and food to the tissues, and brings back the waste products to organs whose purpose it is to dispose of them. It is also charged with the important function of distributing heat equably throughout the body. How does it do this? It is rapidly forced along by a pump (the *heart*) through tubes to the tissues (*arteries*); there, in a network of minute thin-walled vessels (*capillaries*), moving more slowly, it does its work, and at last returns to the heart by another set of vessels (*veins* and *lymphatics*).

The heart.—The heart is a hollow muscle which contracts at regular intervals, and forces the blood forward. These contractions constitute the heart's beat. It is situated in the chest between the lungs, and is enclosed in a fibrous bag lined with smooth moist membrane to prevent friction. This bag is called the **pericardium**. The heart is divided by a vertical partition

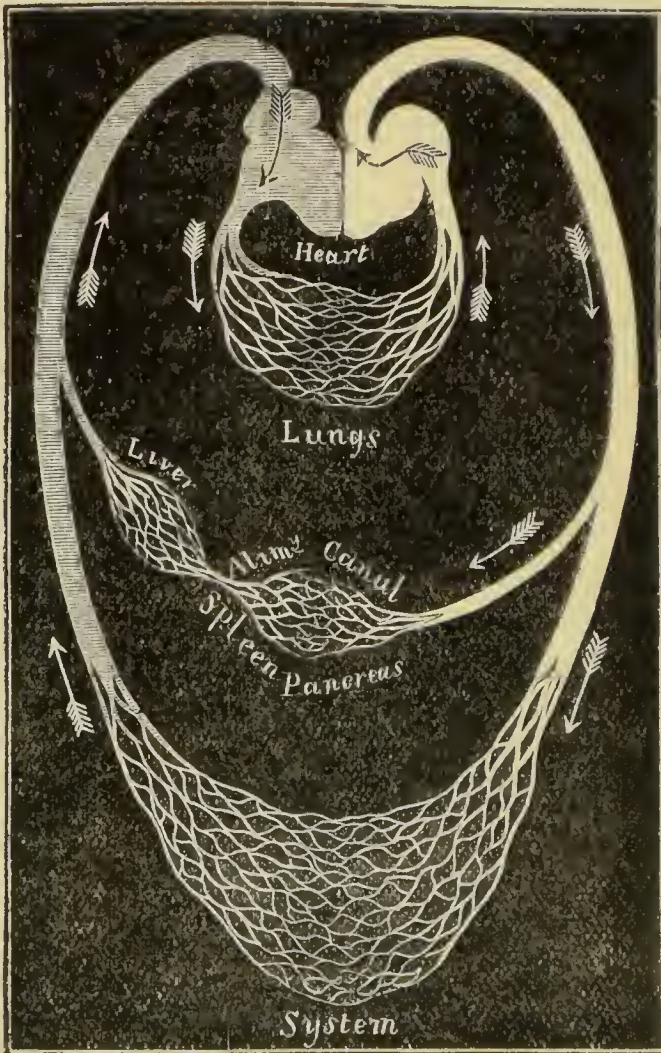


FIG. 7.—DIAGRAM OF THE CIRCULATION IN MAN.

into two pumps which, though they work together, have quite separate functions. The right pump receives the dark purple blood from the veins, and pumps it to the lungs to get its oxygen and give up the carbonic acid. The left pump receives the bright red blood from the lungs and pumps it to the remotest region of the body. Hence the walls of the left pump are much stronger and thicker than those of the right.

Each pump has a receiving chamber (*auricle*), which drives

the blood into the discharging chamber (*ventricle*); between these two chambers is a valve preventing the blood from leaking back from the ventricle into the auricle, and there is another set of valves preventing the blood from leaking back into the ventricle after being driven out. The course of the blood then is as follows:—The veins pour the dark purple blood into the right auricle, and it is then driven into the right ventricle, which pumps it into the capillaries of the lungs. Here it becomes changed in colour, and flows as a bright crimson stream back to the heart into the left auricle, thence into the left ventricle, which expels it into the main artery of the body, the **aorta**.

The aorta is an arched elastic tube given off from the upper broad end of the heart; from its upper convex surface spring the large arteries to the head and arms, then curving down and back it lies close against the spine, giving off on its way down, first branches to the chest walls, and then, having entered the abdomen, branches to the liver, stomach, and other organs. It finally divides at a point corresponding to the navel into two large arteries (*right and left common iliacs*) for the supply of the lower limbs and pelvic organs. The blood in the arteries flows with a series of spurts transmitted by each beat of the heart. This constitutes the **pulse** most commonly felt at the wrist, where the artery is conveniently placed, but it can be felt in numerous situations in the body wherever an artery lies near the surface. When the body is at rest the heart usually beats 72 times to the minute.

The capillaries have extremely thin walls, which allow a considerable quantity of the liquor sanguinis to exude through, and so the blood nourishes the tissues by direct contact. The red corpuscles do not leave the interior of the capillaries, but pass along directly into the veins. The exuded fluid, besides bringing nourishment to the tissues, absorbs waste materials, and is then carried off by a system of vessels called **lymphatics**. The capillaries therefore constitute an irrigation system, the lymphatics a drainage system.

Veins.—The veins carry the blood from the capillaries to the heart. The deep veins usually accompany the arteries; but there is another set of quite superficial veins lying just under-

neath the skin, which can be plainly seen on the backs of the hands and in the arms, especially in thin muscular men. Their walls are thinner than those of arteries, and, unlike them, mostly contain valves which prevent the blood regurgitating towards the capillaries. The blood in the veins flows in an even stream, more quickly than in the capillaries, but far more slowly than in the arteries, and not in the pumping jets transmitted by the heart. The veins of the body terminate in two large vessels (superior and inferior venæ cavæ) which pour the blood into the right auricle of the heart.

The lymphatics commence in the tissues as minute spaces, and collect the liquor sanguinis exuded by the capillaries into small tubes ; the fluid is now called *lymph*. This impure fluid runs through a network of fine tubes containing valves which finally join two large vessels which empty themselves into veins at the root of the neck, and thus the fluid rejoins the blood stream. On its way to join the veins it passes through numerous kidney-shaped bodies, **lymphatic glands**, which act as filters. The lymphatics of the stomach and intestine absorb fat after it has been digested, and contain a milky fluid, *chyle*, which is lymph with fatty matters suspended in it.

THE LUNGS AND RESPIRATION

The windpipe (*trachea*, fig. 8, 2) begins at the upper part of the neck, where the organ of voice (*Adam's apple* or *larynx*, fig. 8, 1) is situated. It runs down into the chest and divides into two large air tubes (*right* and *left bronchi*, fig. 8, 3 and 4), one to each lung.

The lungs are two large elastic spongy bodies of conical shape, one on each side of the heart, situated in the air-tight cavity of the chest. The outer surface is convex, and fits the concave inner surface of the chest-wall. Their inner surface is concave, and the two lungs together almost surround the heart as it lies in its fibrous bag. The whole of the chest cavity is lined with a smooth moist membrane, which also surrounds the lungs, so that the lungs and chest wall are accurately co-adapted and yet permitted to glide against one another without friction. This membrane is called the **pleura**. When a breath is taken

(inspiration) the cavity of the chest is enlarged by the contraction of certain muscles, the ribs being lifted up and the arched floor of the chest (the diaphragm) flattened so that the

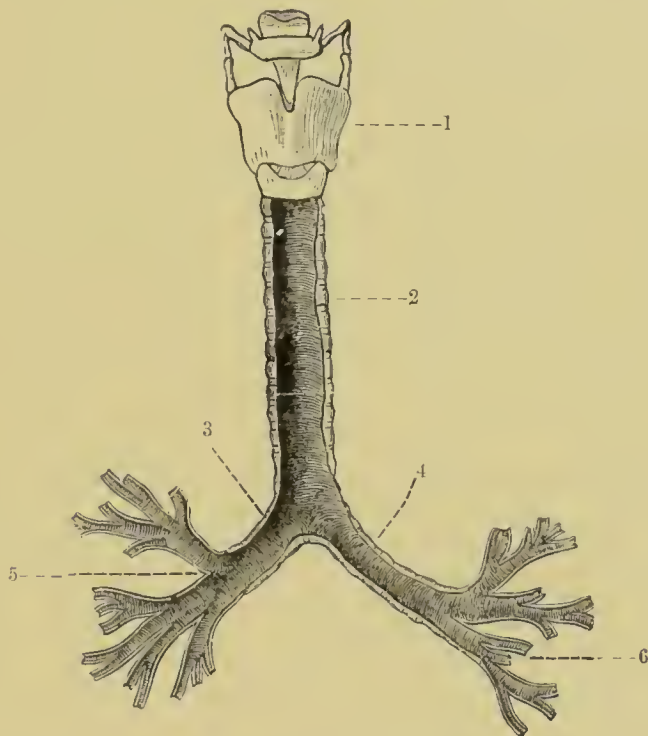


FIG. 8.—THE LARYNX, WINDPIPE, AND BRONCHIAL TUBES.

1. The larynx. 2. The trachea. 3 and 4. Right and left bronchi. 5 and 6. Right and left bronchial tubes. Below the larynx the front of the tubes has been removed.

lungs are stretched and the air sucked in. In breathing out (expiration) the muscles relax, the ribs fall into the position of rest, the elastic lungs contract and the air is driven out. During calm breathing from 25 to 30 cubic inches of air are drawn in and driven out at each breath; but as much as 230 cubic inches can be driven out after a very deep inspiration.

The bronchi and blood-vessels enter the inner (*i.e.* next the heart) surface of each lung. The bronchi divide and subdivide like the branches of a tree, and at last terminate in innumerable small dilatations called air-cells. These air-cells are everywhere surrounded by a fine network of capillaries, and have extremely thin walls, which allow the oxygen from the air, and the carbonic acid from the blood, to pass through. It is here that the venous blood from the right side of the heart

gives up its carbonic acid ¹ and some watery vapour, and taking in its store of oxygen changes its colour and returns to the left side of the heart as arterial blood.

The diaphragm.—It will be as well to describe here this important structure, which separates the chest from the abdomen. It is a dome-shaped, partly muscular, partly tendinous partition; its circumference consisting of muscular fibres which arch upwards and converge to a central tendinous sheet.

During inspiration the muscular fibres contract, and the diaphragm becomes flatter, thus enlarging the cavity of the chest from above downwards, at the same time the abdominal organs are pushed slightly down, causing the abdominal wall to bulge forwards.

It is perforated by three large apertures; one for the tube which leads to the stomach (*œsophagus*), another for the aorta and the duct carrying the lymph up from the intestines, and a third for the large vein (*inferior vena cava*) carrying the blood from the lower limbs and abdomen up to the heart. It is attached to the spine behind, to the ribs on each side, and the lower end of the breast bone in front.

On its upper convex surface rest the broad bases of the lungs, covered by pleura, and the heart encased in its fibrous sac. Its concave under surface is in contact with the liver, stomach, spleen, and left kidney.

DIGESTION AND THE DIGESTIVE APPARATUS

Food, on being taken into the mouth, is moistened by the saliva, and rolled from side to side by the tongue, which, with the muscles of the cheeks, bring it between the teeth to be crushed. When sufficiently macerated the tongue forces it back to be grasped by the muscles of the gullet and swallowed. The saliva, besides moistening the food, dissolves the more soluble constituents, and helps to digest starchy foods, such as bread and potatoes, converting the starch into a kind of sugar. At the back of the mouth, behind the fleshy arch (*fauces*), the

¹ Other vitiating substances, the nature of which is not exactly known, are also given off. Air which has been repeatedly breathed in an ill-ventilated room produces an effect which cannot be accounted for by the amount of carbonic acid and decrease of oxygen.

air passages of the nose join the gullet and form one common chamber, the *pharynx*, which extends as low down as the upper part of Adam's apple (*larynx*). Here the passage divides into two: the front one, guarded by a leaf-shaped cartilage (*epiglottis*), to prevent the entry of food, leads to the lungs; the one behind, a more direct continuation, is the tube to the stomach, the *œsophagus*.

The œsophagus is a muscular tube, and food is passed along it by the contractions of its circular fibres, which, starting above and running down, squeeze down the contents like an india-rubber tube being compressed and pulled through the fingers. This movement is called peristalsis, or peristaltic movement, and can be well seen in the neck of a swan when feeding. Food is passed along the intestine in the same way. The œsophagus lies close to the spine, and, passing through the chest, perforates the diaphragm and immediately joins the stomach.

The stomach.—The shape of the stomach and the arrangement of the intestines can readily be understood by reference to the diagram (fig. 9). Note the shortness of the upper border compared with the long rounded lower border, giving it its pouch-like shape. Note also the large round left end (fig. 9, 2), and how it becomes smaller to the right, where it joins the intestine. The position of the stomach varies to a great extent according to whether it is empty or distended. The upper border is fixed, and lies under the diaphragm and liver; when empty the lower border hangs down and the front of the stomach comes near the surface of the abdomen at the angle formed by the ribs joining the breast-bone—the pit of the stomach. When distended the lower border tilts up so that the front surface looks somewhat upwards, and the back surface downwards. From the lower border hangs the *apron* or *great omentum*, covering the front of the intestines as low down as the pelvis. This is a broad sheet of membrane containing fat, and its use appears to be to protect the intestines from cold.

The intestines are a muscular tube, twenty-five feet in length in the adult. This is one continuous tube leading from the stomach to the external orifice (the *anus*), but is divided into two portions, the *small* and *large* intestine.

The small intestine (fig. 9, 3) is a convoluted tube twenty feet in length looped up and supported by a membrane, the *mesentery*. This membrane is fan-shaped, the small end

receiving the main vessels and being attached near the spine; the broad end is attached to the upper border of the intestine throughout its length. In it run the arteries, veins, lymphatics, and nerves to supply the coats of the intestine, and carry off food as it is digested and absorbed.

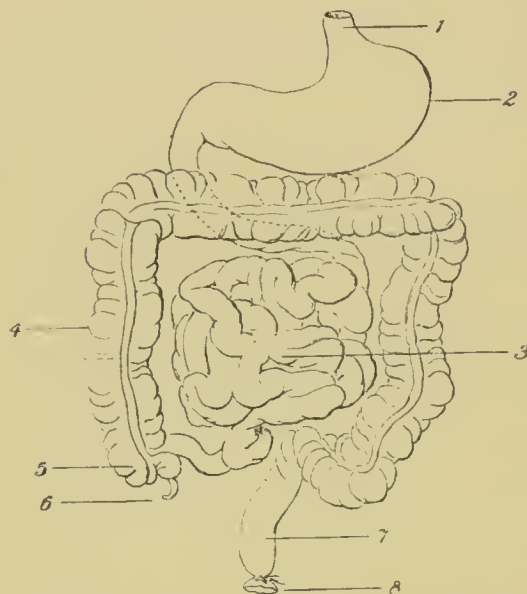


FIG. 9.—DIAGRAM OF THE ARRANGEMENT OF THE STOMACH, SMALL INTESTINE, AND COLON.

1. Lower end of the oesophagus. 2. Left end of stomach. 3. Small intestine looped up and forming a convoluted tube. 4. Colon: ascending, transverse, and descending. 5. Caecum. 6. Vermiform appendix. 7. Rectum. 8. Anus.

in the lower part of the abdomen to the right of the middle line—the *ileo-caecal region*. This region will be frequently referred to, as it is often the seat of disease, and has to be examined for tenderness, swellings, &c. Attached to the caecum is a curious worm-like body—the *vermiform appendix* (fig. 9, 6) the use of which is not properly understood. It is a minute, hollow off-shoot from the intestine, terminating blindly in a rounded end. Its chief interest lies in the fact that it frequently becomes diseased, and gives rise to serious abdominal maladies.

From the caecum the large intestine forms an arch: it ascends on the right side of the abdomen to the under surface of the liver; then loops across the front of the abdomen, lying just above the level of the navel, to the left side under the ribs, and thence descends into the pelvis and forms the lower bowel (*rectum*, fig. 9, 7), which terminates at the external orifice (the *anus*, fig. 9, 8).

The peritoneum.—The interior of the abdomen is lined by a smooth, moist membrane, which serves the same purpose to the abdominal contents as the pleura does to the lung. This is called the peritoneum. The small intestines are completely surrounded by it, and the rest of the organs to varying degrees according to the amount of dilatation or other alteration in shape they undergo during the performance of their functions.

The liver and pancreas.—These are two large and important glands in connection with the intestine.

The **liver** is a large organ situated beneath the diaphragm, and extends from the spine behind to the abdominal wall in front. It is much thicker behind than in front, and if the body were cut vertically down, by far the larger part would lie in the right section. Its upper surface fitting the diaphragm is smooth and convex; its under surface is irregular and concave, and marked by depressions where the neighbouring organs, stomach, colon, and right kidney, come in contact with it. It has a very large blood supply, the whole of the venous blood from the stomach, intestines, and spleen circulating through it on its way back to the heart.

It has several most important functions.

1. It secretes bile.
2. It converts certain waste products of the body into a substance called urea, which is ultimately excreted by the kidneys.
3. It stores up starchy foods in its substance.

The bile when secreted is collected in a reservoir, the gall-bladder, and discharged as required by a tube or duct, which accompanies that from the pancreas into the intestine.

The **pancreas** or sweet-bread lies at the back of the abdomen across the spine, the stomach being in front. It is a pistol-shaped organ, the large end being to the right. The secreted fluid flows through a duct which accompanies that from the gall-bladder and enters the intestine about $3\frac{1}{2}$ inches from the stomach.

Let us now consider how food is digested and absorbed by this apparatus. Food will be more fully dealt with in the chapter on hygiene, and it is sufficient to mention here that, split up into its elements, food consists of—

1. Nitrogenous or proteid substances, mainly in the form of flesh.
2. Fats, contained in both animal and vegetable matter.
3. Starchy or sugary substances.
4. Salts.
5. Water.

The lining membranes of the stomach and intestines are throughout studded with minute glands which secrete certain digestive fluids, and are everywhere permeated by capillaries and lymphatics capable of absorbing food when digested.

Food, as we have seen, reaches the stomach crushed up by the teeth, macerated with saliva, and the starches partly converted into a kind of sugar. Here it is acted on by an acid fluid—gastric juice—which dissolves the more fibrous parts of meats and fats, and the food is churned up into a grumous mixture. Proteids are partially digested and absorbed together with some fluid; but the greater part of the contents of the stomach pass on into the intestine.

When in the intestine the food meets with—

1. The secretion from the liver, bile, which acts on the fatty constituents of food, breaking up the oil globules and converting it into a soapy fluid. It also helps this fluid to pass through the lining membrane of the intestine to be absorbed by the lymphatics. In addition to this it has a purgative action, and prevents putrefactive changes in the intestine.

2. The fluid from the pancreas, which acts on all the more important elements of our food—proteids, starches, and fats—and converts them into substances fit for absorption.

As the food passes along the intestine the digested proteids and starches, and the salts and water, are absorbed by the capillaries, the fats by the lymphatics; so that the contents of the intestine become more and more solid, until at last they consist almost entirely of indigestible matter, together with certain substances derived from the bile, and leave the body as *feces*.

THE HEAT OF THE BODY

All animals belong to one of two classes.

1. Cold-blooded, whose temperatures vary according to the medium by which they are surrounded.

2. Warm-blooded, whose temperatures are so regulated that they remain constant whether their surroundings are hot or cold.

Man belongs to this class. When in health his temperature averages 98.4°F . in the coldest winter weather and on the hottest summer day. It is usually somewhat lower in the early morning, being as low as 97° in some people, and rises to 98.6° or 98.8° in the evening. How is this heat produced? Living tissues are constantly undergoing combustion, consuming oxygen, and producing carbonic acid, and by this process generating heat. The process is much less active in rigid tissues such as bone and cartilage, most active in muscles and glands, and the blood is warmer in deeply-seated organs than in the limbs. But whilst heat is constantly being produced in the body, it is also constantly being given off. Were this not so the temperature of the body would reach boiling-point (212°F .) in a few hours. The circulation of the blood insures an even temperature by distributing the heat. It brings the hot blood from the more deeply-seated organs to the skin, where heat is given off by radiation, conduction, and by the evaporation of the perspiration. A large quantity is also lost by the lungs, which take in cold air, warm it to the temperature of the body, and then drive it out.

To sum up—

Heat is gained to the body—

1. By the chemical changes which take place in every living tissue, especially in muscles when at work, and in large glandular organs such as the liver.
2. By the friction of the muscles.
3. By hot food and drink taken into the body.

Heat is lost—

1. By the skin.
2. By the lungs.
3. By the excretions.

THE ORGANS OF EXCRETION

The waste materials produced by the working of the human body are carbonic acid, urea, and water. Carbonic acid, we have seen, is mainly given off by the lungs, and they may well be considered as organs of excretion. They also give off a large

quantity of water in the form of vapour. The remaining water and some carbonic acid is given off by the skin in the form of sweat, and by the kidneys as urine.

The skin.—The skin is an elastic, pliable, sensitive and protective covering to the body. It serves the double purpose of preserving the warmth of the body and enabling it to get rid of heat when necessary. The whole surface of the skin is studded with minute orifices, the openings of the **sweat glands**, which are situated in its substance. These have been estimated to amount to two and a half millions in number. They are constantly secreting more or less moisture; usually in such small quantities that we are quite unconscious of it, but at times so profusely that the moisture pours off the body in trickling streams. This moisture comes directly from the blood. Each sweat gland is surrounded by a network of capillaries, and in obedience to certain nervous impulses the capillary yields the fluid to the gland. By this profuse secretion, and the evaporation of the fluid, an enormous amount of heat is lost to the body which would, if retained, produce injurious effects. In addition to water the skin excretes carbonic acid, urea, fatty matters, and salts in small quantities.

Besides the sweat glands there are present in the skin glands of another kind which secrete a fatty substance for the nourishment of the hairs, and for lubricating the surface of the skin. These are called **sebaceous glands**.

The kidneys.—The kidneys are situated in the upper part of the abdomen, one on each side of the spine, lying against the lower ribs. They act as filters, having the special power of selecting certain waste products from the blood and allowing them to pass through in the form of urine.

Each kidney is supplied by a large artery to bring the blood, a vein to return it after filtration, and a duct (the *ureter*) to carry off the urine. The two ureters, one from each kidney, run down into the pelvis, and empty themselves into the urinary bladder. The quantity of urine secreted in the twenty-four hours averages $2\frac{1}{2}$ pints, but the quantity varies very greatly according to the amount of fluid taken into the body and the amount given off by the skin. In hot dry weather the

skin acts freely, and much perspiration is given off, so that comparatively little fluid leaves the kidney; in cold weather perspiration is scanty and much urine is secreted. Roughly, more urine is secreted in winter than in summer, but it is a matter of common experience how large a quantity of urine is passed on a cold wet day in summer when the previous days have been hot and dry. The colour of the urine also varies according to the amount passed, being of a deeper colour when the urine is scanty, owing to its being more concentrated. After hard muscular exercise when the skin has been acting freely it is of an orange colour, and though clear at first often deposits a thick red sediment on standing. Here the amount of solids is out of proportion to the amount of fluid, and a little hot water added to the urine immediately makes it become clear again. In cold damp weather the urine passed is almost colourless. The principal constituent of urine is a substance called *urea*. This is the waste product of nitrogenous food after it has been utilised by the body, and the quantity excreted is in direct proportion to the amount of nitrogenous food taken.

The urinary bladder is an oval muscular bag situated in the pelvis in front of the rectum. When empty it lies completely behind the front bony arch of the pelvis; but when distended it may be felt in the lower part of the abdomen, and in cases of great distension it may be felt as a rounded tumour reaching up as high as the navel. The urine flows from the kidneys down the ureters and enters the bladder drop by drop. In the lower part of the bladder is a single aperture leading to a canal, called the *urethra*, for the discharge of the urine. This aperture is kept closed by a muscle (*sphincter*) which is always contracted except during the act of passing water (*micturition*). When the bladder is being distended the sphincter is kept contracted, and the muscular fibres of the bladder walls are relaxed and allow the urine to enter drop by drop. When the bladder is sufficiently distended, the desire to pass water is felt; the sphincter then relaxes, the muscular walls of the bladder contract, and the contents are discharged.

DUCTLESS GLANDS

There are certain organs situated in the body which exert a definite influence on the blood as it passes through them, but which do not possess canals or ducts to carry off their secretions. Their functions are imperfectly understood. These bodies are known as ductless glands.

1. **The thyroid** lies in the neck below the larynx and on each side of the upper part of the windpipe. When enlarged it gives rise to goitre. It regulates the formation and excretion of a substance called *mucin*. If diseased or removed by operation the intellect becomes dull, the speech slow, the muscles weak, and the skin very coarse and thick.

2. **The thymus gland**, situated at the root of the neck and upper part of the chest, is a large organ in infants, but at the end of the second year of life begins to diminish in size, and in adults only a functionless vestige of it remains. It seems to perform the same function as a lymphatic gland.

3. **The spleen** lies in the abdominal cavity in contact with the left end of the stomach. It is a spongy body surrounded by a thin muscular capsule, and is supplied with blood by a very large artery. It varies greatly in size, becoming much larger a few hours after a meal has been taken. It appears to exert a definite influence on the blood corpuscles, breaking up the old and generating new ones.

4. **The two supra-renal bodies** are in shape somewhat like a cocked-hat, and are situated one on the upper end of each kidney. When diseased, the skin becomes dark in colour, the circulation feeble, and the strength gradually fails.

THE ORGANS OF THE SPECIAL SENSES

The eye.—The eyelids are movable folds of skin, strengthened near their margins by dense fibrous tissue, which protects the eyeballs. Their under surface is lined by a vascular membrane (the *conjunctiva*) which is continuous with the skin at the edge of the lid, and becoming much thinner, turns round and

covers the front of the eyeball. In a bony recess under the upper lid, to the outer side of each eyeball, is an almond-shaped body—the lachrymal gland—which secretes the tears. These are discharged by numerous fine ducts under the upper lid and then flow down and in across the eyeball, keeping its surface continually moist. If the lids are separated and slightly turned out a small eminence will be noticed on the edge of each, about a quarter of an inch away from the inner rounded corner near the nose. On the top of each eminence is a minute aperture, the orifice of a duct, to carry off the tears. These ducts join a larger canal embedded in the bones of the face which discharges into the nasal passage. The sniffing of a weeping child is due to the entry of tears from the eyes into the nose.

The eyeball is a globular body situated in the orbit and protected by the surrounding bones. It is acted upon by numerous muscles, by which it is turned in various directions. The greater part of its outer coat (the *sclerotic*) consists of opaque fibrous tissue, but in front a circle of clear transparent tissue (the *cornea*) is inserted. Behind the cornea is a delicate muscular veil (the *iris*) with a circular aperture in its centre (the *pupil*), which varies in colour in dark and fair people. Its function is to shut off unnecessary rays of light. The iris contracts the pupil when the eye is exposed to a strong light, and on looking at near objects, and dilates it when the eye is shaded and on looking at distant objects. The iris rests against a circular elastic body (the *lens*) convex on both sides. The lens alters its shape, becoming more convex or flatter for the purpose of focussing the rays of light on the back of the eyeball. This alteration of shape is effected by a circular muscle (the *ciliary muscle*), and the act of focussing the eye is called accommodation.

Behind the lens is a large cavity filled with a gelatinous fluid, and spread out over the inner concave surface of the eyeball is a delicate nervous membrane (the *retina*) for the reception of images focussed on to it, which are thence conveyed by a large nerve (the *optic nerve*) to the brain.

The ear.—For the purpose of description the organ of hearing may be conveniently divided into three parts.

1. *The external ear* consists of the irregular-shaped cartilage, the *auricle*, movable in the lower animals and still

possessing rudimentary muscles in man, which collects the waves of sound and conveys them to the tube leading to the drum. This tube, the *external auditory canal*, is composed partly of cartilage, partly of bone, and is doubly curved, but can be much straightened by gently pulling the ear upwards and backwards. It leads inwards to—

2. *The middle ear. drum or tympanum.*—This is a cavity containing air, lodged in the bones of the head, only a thin plate of bone separating it from the membranes of the brain. Its outer wall is formed by a thin glistening membrane, the *membrana tympani*, which vibrates on receiving the waves of sound passing in through the external canal. In connection with it are three small bones, forming a chain, which convey the vibrations across the tympanum. There is a canal, the *eustachian tube*, passing up from the back of the nose, which admits the air into the cavity of the tympanum, and so equalises the pressure of the external air and that within the tympanum; without this the membrane could not vibrate properly. There is also an aperture communicating with some spaces containing air (*mastoid cells*) in the bone behind the ear.

3. *The internal ear or labyrinth* is a most complex structure, composed of bony and membranous tubes containing fluid. There is a small aperture in its outer wall into which one of the small bones of the middle ear fits, and by means of this aperture the vibrations conducted by the chain of bones are transmitted to the fluid. There are two important structures which help to form the labyrinth. The *cochlea*, resembling a small snail shell, directly concerned in appreciating sound; and the *semicircular canals*, three minute bony tubes which are not concerned in hearing, but which transmit to the brain certain impulses enabling us to balance our bodies. When diseased distressing giddiness supervenes. Both the cochlea and semicircular canals receive branches from a large nerve, the auditory nerve.

THE ORGAN OF VOICE

The larynx, commonly known as Adam's apple, situated in the upper part of the throat, communicates above with the pharynx, below with the windpipe. The upper aperture is

guarded by a leaf-shaped cartilage, the *epiglottis*, which prevents the entry of food and liquids during the act of swallowing. The larynx is a cartilaginous case containing the *vocal cords*. These are two fibrous elastic bands arranged like a V, the sharp end in front; when air is driven through them they vibrate, and sound is produced. By the action of several small muscles the cords are brought close together and tightened in uttering high notes, and separated and relaxed in uttering low notes. Above the vocal cords is a deep recess on each side studded with numerous small glands which secrete a fluid which lubricates the cords.

SMELL AND TASTE

These senses are intimately associated. For the development of the sense of smell it is necessary that the substance should be volatile, and air must be present, so that the particles are carried to the upper part of the cavity of the nose, and there stimulate a special nerve.

The lower part of the nasal passages is sensitive to pungent odours, such as ammonia, but is not endowed with the power of smell proper, and its function is to admit air, warm it, and filter off the grosser particles of dust on its way to the lungs.

The tongue is the organ of taste, and for a substance to be tasted it must be either moistened, or dissolved by the saliva in the mouth. The tongue is extremely gifted with the sense of touch, and in appreciating degrees of heat and cold. It is also the organ of articulate speech, and, as we have already seen, it guides the food between the teeth to be masticated, and finally passes it back to be swallowed.

CHAPTER II

REGIONAL ANATOMY

The Head and Neck—The Chest—The Abdomen—The Back—The Shoulder and Armpit—The Arm, Elbow, Forearm, and Hand—The Lower Limb: the Buttock and Thigh; the Knee, Leg, and Foot.

THE object of this chapter is to indicate the position of the various organs and principal arteries with relation to the surface of the body. Special attention must be given to the points where pressure on the arteries may most easily be applied to control bleeding. The methods of applying pressure will be found described in the chapter on hæmorrhage. The more conspicuous muscles will be named and their actions on the limbs indicated.

HEAD AND NECK

The neck.—In the middle line the prominence of the larynx (fig. 10, 1) can be felt, and below it the **windpipe** (2) passing down beneath the breast-bone. From the top of the breast-bone and inner ends of both collar-bones run two prominent muscular bands, the **sterno-mastoid muscles** (fig. 10, 3), passing up to be attached to the skull behind the ears. These turn the head; the right muscle turning the face to the left, and *vice versa*. They protect the main arteries of the head and neck, the **carotids** (fig. 10*), which run up from a point opposite the joint formed by the collar-bone and breast-bone to a joint just behind the angle of the jaw (fig. 10, 4). Compression is somewhat difficult, but may be effected by placing the fingers at the back of the neck and with the thumb in front on the artery (at the point*) squeezing it back against the spine. In thin people there is a deep hollow just above the collar-bone and outside the sterno-mastoid muscle. Across this hollow under the skin run the blood-vessels and nerves to the arm. The artery (**subclavian****) may here be compressed against the rib,

on which it lies, in cases of hæmorrhage in the arm and armpit. A large vein can be seen under the skin passing from the angle of the jaw to a point opposite the centre of the collar-bone. This is the **external jugular vein**.

There are groups of **lymphatic glands** in the neck which become enlarged and tender when the regions from which they receive the lymphatic vessels are affected by certain diseases.

One group, just below the angle of the jaw, receives the lymphatics from the tonsil, throat, and gums of the lower jaw; another group, under the chin, those from the lips and chin; and a third, behind the ear and at the nape of the neck, those from the ear and back part of the scalp.

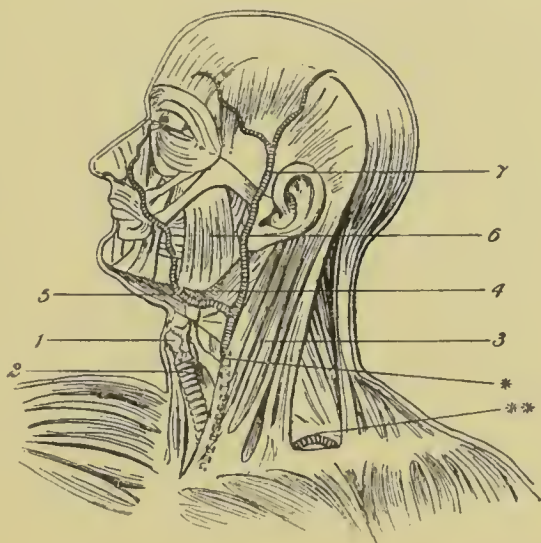


FIG. 10.

1. Larynx. 2. Windpipe. 3. Sterno-mastoid muscle.
* Carotid artery, at point where compression is most easily effected. 4. Angle of jaw. ** Subclavian artery. 5. Facial artery. 6. Masseter muscle. 7. Temporal artery.

The face and scalp.—The mouth. On looking into the mouth, the teeth are seen arranged in two horse-shoe rows; they number sixteen in each jaw in the adult. The front teeth are sharp edged for cutting purposes, the back teeth have irregular broad surfaces for grinding the food. The tongue is attached to the floor of the mouth and inner surface of the lower jaw; when the lips are closed the upper surface accurately fits the roof of the mouth and the tip and sides rest against the teeth. Note that on the upper surface, at the extreme back, there are some wart-like elevations (*papillæ*) arranged like a V, the point backwards. These, when noticed for the first time, are not unfrequently thought to be some form of disease by nervous people. Lying over the back of the tongue is a fleshy double arch, the **soft palate**, from the centre of which hangs a small tongue-shaped body, the **uvula**. In a recess at the root of the arch on each side lie the **tonsils**, two rounded

bodies which vary greatly in size and shape in different individuals.

The saliva is secreted by glands which exist in three pairs. One pair lie behind the chin, another under the angles of the jaw, and a third pair, much larger, are situated partly on the cheek and partly under the jaw below and in front of the ear. The two main arteries of the face (**facial arteries**, fig. 10, 5), one on each side, take a very tortuous course. Each artery runs over the lower jaw just in front of the large cheek muscle (**masseter muscle**, fig. 10, 6), which may be felt as a firm mass on clenching the teeth, and this is the point where the artery can easily be compressed in wounds of the face. The two arteries communicate with each other so freely across the face that it is necessary to compress the artery on both sides. From this point it runs up near the corner of the mouth, then to the nose just outside the nostril, and up to the inner corner of the eye.

Just in front of the ear another artery (**temporal artery**, fig. 10, 7) may be felt running up over the cheek-bone to supply the front part of the scalp with blood. It is here that a doctor, when giving chloroform, feels the pulse. Here, too, is a lymphatic gland, which becomes swollen and tender in certain affections of the eyelids, cheek, forehead and front part of the scalp. The arteries of the scalp are embedded in coarse fibrous tissue, and bleed very freely when divided. The bleeding is, however, very readily stopped by applying pressure at the bleeding point.

The bones of the skull vary much in thickness, being especially thin in the orbits and at the temples. A weapon thrust into the eye often penetrates the thin bony plate which separates the orbit from the brain. The temples, so much exposed to injury, are fortunately protected by a thick muscle encased in a strong fibrous sheath.

In infants there is a lozenge-shaped interval between the bones on the top of the head, which can be felt through the scalp. This gradually becomes smaller after birth, and closes completely at the end of the second year.

THE CHEST

In front the breast-bone can be felt beneath the skin; the collar-bones are attached to it above by a freely movable joint,

and curve outwards to join the shoulder-blades. About two inches from the top of the breast-bone a slightly raised ridge can be felt which corresponds to the position of the second ribs on each side. This is a useful landmark in counting the ribs. From each side of the breast-bone and inner half of the collar-bones run two broad fan-shaped muscles to be inserted into the upper part of the arms. These are the great **pectoral** muscles (fig. 12, 2). When they contract, the arms are pulled forward and across the chest. The lower, pointed end of the **heart** can be felt beating against the chest wall in the space between the fifth and sixth ribs, three inches to the left of the breast-bone. The upper, broad end lies on a level with the second ribs, and is in the centre of the chest under the breast-bone. The **lungs**, encased in pleura, lie on each side of the heart (fig. 11, 1); the

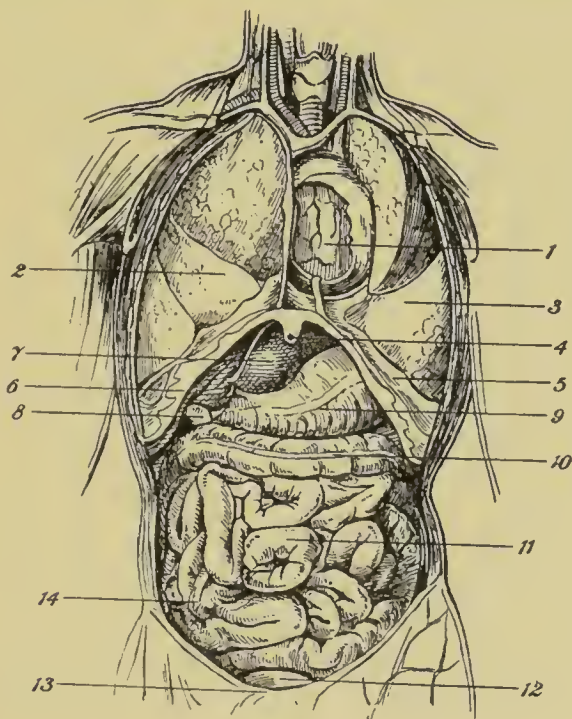


FIG. 11.

1. The pericardium laid open showing the heart. 2. The right lung. 3. The left lung. 4. Lower end of breast-bone. 5. The diaphragm. 6. Arch formed by the cartilages of the lower ribs. 7. The liver. 8. The gall-bladder. 9. The stomach. 10. Transverse portion of the large intestine. 11. The small intestine. 12. The urinary bladder. 13. The pubes. 14. Ileo-cæcal region.

top of each rises above the upper limit of the chest, usually about one inch above the collar-bones. Their broad curved bases, resting on the diaphragm, extend much lower at the back (level of the tenth ribs) than in front (level of the sixth ribs).

THE ABDOMEN

The navel (umbilicus) is situated slightly nearer to the front bony arch of the pelvis (the pubes, fig. 11, 13) than to the lower end of the breast-bone. The space in the abdomen above the navel is popularly called the 'pit of the stomach,' and contains the following organs :—

1. The **liver** (fig. 11, 7) lies under and occupies the greater part of the arch of the diaphragm; it is almost completely covered by the ribs, but part of it comes into contact with the front of the abdominal wall. The **gall-bladder** (fig. 11, 8) lies just below the ninth rib on the right.

2. The **stomach** (fig. 11, 9) lies under the diaphragm, partly covered by the liver and the left lower ribs, and also rests against the front of the abdomen.

3. The **spleen** lies against the left ribs rather behind the left end of the stomach.

4. The **pancreas** is behind the stomach across the spine.

5. The **kidneys** are at the back of the abdomen on each side of the spine behind the pancreas.

6. The **transverse colon** (fig. 11, 10) crosses the front of the abdomen just below the stomach and above the navel.

Below the navel the abdominal cavity is mainly occupied by the coils of the small intestine (fig. 11, 11). Low down in the pelvis lies the **urinary bladder**, and in the female, the internal organs of generation. On the right (the **ileo-cæcal region**, fig. 11, 14) lies the junction of the small with the large intestine, and the **vermiform appendix** (fig. 9, 6). On the left lie the lower end of the **colon** and the upper end of the **rectum** (fig. 9, 7). Just below and to the left of the navel the **aorta** divides into two large arteries to supply the legs and pelvic organs.

THE BACK

The vertebræ can be felt under the skin from the back of the neck down to the pelvis, the sixth and seventh being especially prominent. From each side of the spine, muscles run outwards to be attached to the shoulder-blades, forming firm masses on the back of an athlete. From the centre of the back right down to the pelvis there arises a broad strong muscle

(**latissimus dorsi muscle**), which passes up to be inserted into the upper part of the arm. This pulls the arm downwards and backwards, or if the arm is extended and fixed as in climbing, will draw the body up to the arm. On listening to the back of the chest the air can be heard entering and leaving the lungs from the lower part of the neck as low down as the tenth ribs.

THE SHOULDER AND ARMPIT

The rounded prominence of the shoulder is partly formed by the globular head of the humerus and partly by a thick, strong muscle (the **deltoid**, fig. 12, 1), which arises from the

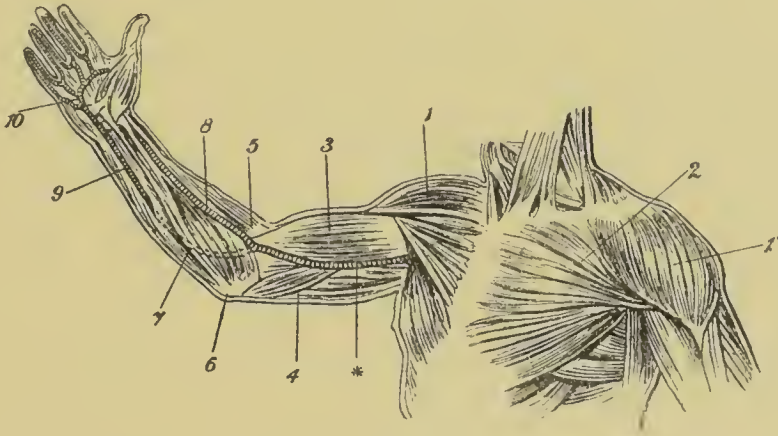


FIG. 12.

1. The deltoid muscle. 2. Pectoralis major muscle. 3. Biceps muscle. * Brachial artery. 4. Triceps muscle. 5. Supinator longus muscle. 6. Internal condyle. 7. Flexor muscles, covering the upper part of the ulnar artery. 8. Radial artery. 9. Ulnar artery. 10. Palmar arch.

collar-bone and shoulder-blade, and is inserted into the outer surface of the shaft of the humerus. This muscle raises the arm from the side on a level with the shoulder; lying in contact with the inner border of this muscle is the narrow part of the **pectoralis major** muscle (fig. 12, 2) already described. Under the shoulder between the arm and the chest wall is the deep depression known as the **armpit**. This is a space padded with fat containing the blood-vessels and nerves passing out to the arm, and a large number of lymphatic glands which become affected in certain diseases of the hand, arm, and chest wall.

THE ARM, ELBOW, FOREARM, AND HAND

The arm.—When the arm is hanging naturally by the side the well-known **biceps** muscle (fig. 12, 3) forms a rounded

prominence along the front and inner part of the arm extending to a short distance from the bend of the elbow; it terminates in a tendon which is inverted below the head of the outer bone (radius of the forearm). Its action is to bend the elbow and turn the palm upwards. The main artery (**brachial artery**, fig. 12*) lies close to the bone on the inner side of, and somewhat overlapped by, the biceps. Surrounded by nerves in the upper part of the arm, it may easily be felt pulsating throughout its course as far as the bend of the elbow. With the thumb outside the arm, and the fingers grasping the inner surface, the artery can readily be compressed against the bone at the point * (fig. 12). The back of the arm receives its shape from the **triceps** muscle (fig. 12, 4), which is inserted into the tip of the elbow, and has a directly opposite action to the biceps, *i.e.*, it straightens the elbow. About two inches above the elbow on the outer side of the arm a group of muscles (**supinator longus**, &c., fig. 12, 5) arise which terminate in tendons inserted in the neighbourhood of the wrist. These muscles help to bend the arm and strengthen the wrist in lifting weights.

The elbow.—The **internal** and **external condyles** and the point of the **elbow** are the bony landmarks which can be felt under the skin when the arm is straight, but still more easily when the elbow is bent. The internal condyle (fig. 12, 6) projects more backwards than inwards, and is much more prominent than the external condyle. Behind it lies the ‘funny bone,’ in reality a nerve which supplies many of the muscles of the forearm with motor fibres, and the little finger and adjoining side of the ring finger with nerves of sensation. Just above the internal condyle lies a lymphatic gland, sometimes enlarged in affections of the fingers. The head of the **radius** lies below, and separated by a groove from, the external condyle; its rounded form can be made out, and it can be felt to rotate on turning the palm upwards and downwards.

Midway between the condyles, and just inside the biceps tendon, lies the **brachial artery**. The superficial veins of the forearm can be seen uniting to form two large vessels, which pass up the arm, one on the outer side, the other on the inner side of the limb. The point of the elbow, formed by a beak-like projection of the ulna, has a **bursa** overlying it between it and

the skin, occasionally enlarged by prolonged resting the elbow on a table, or as the result of a blow.

The forearm.—From the internal condyle (fig. 12, 6) a mass of muscles arise which form the rounded inner and front surfaces of the forearm. These terminate in tendons which are inserted into the palmar side of the wrist and hand, bending the wrist and clenching the fingers. From the external condyle another group of muscles pass down the back of the forearm and end in tendons inserted into the back of the wrist and fingers, which they extend. The brachial artery divides into two just below the bend of the elbow, and the two vessels run down on the palmar side of the forearm. The outer of these two, the **radial artery** (fig. 12, 8), is overlapped above by the supinator longus muscle (fig. 12, 5), but at the wrist it is only covered by the skin. It is here the **pulse** is usually felt. The artery lies outside all the tendons on the front of the wrist, and just inside a prominent ridge of bone on the lower end of the radius. The artery then turning outwards passes under the tendons of the thumb, and having crossed the depression between the tendons, commonly called the ‘snuff-box,’ dips in between the metacarpal bones of the thumb and first finger to supply the deep tissues of the palm. The inner branch of the brachial, the **ulnar artery** (fig. 12, 9), is more deeply situated than the radial. It passes under the muscles which arise from the internal condyle, and then lies between the inner tendons of the wrist on its way to the palm.

The radial and ulnar arteries can easily be compressed against the bones at the wrist.

The hand.—The rounded ball of the thumb is formed by the short muscles of the thumb, that on the inner side of the hand by those of the little finger. Between these two eminences a strong layer of fibrous tissue runs from the wrist to the fingers, which prevents the underlying structures being injured when the hand grasps any hard object. Immediately under this fibrous layer lies the continuation of the ulnar artery, which arches across the palm (**palmar arch**, fig. 12, 10) towards the thumb, giving off branches opposite the intervals between the metacarpal bones, which divide at the webs of the fingers into two small vessels, one for each side of the adjacent fingers.

Under this arch lie the nerves and tendons of the fingers. Note that the deep crease across the palm corresponds to the position of the knuckles at the back of the hand, the web of the fingers being an inch distant. Also note how freely movable are the metacarpal bones of the thumb, little finger, and to a lesser degree that of the ring finger, compared with those of the middle and fore fingers.

THE LOWER LIMB

The thigh.—The abdomen is separated from the thigh by a curved furrow which marks the situation of a strong fibrous band under which the vessels and nerves pass. With the thigh slightly bent and turned out, a line drawn from the centre of this furrow to the inner side of the knee indicates the situation of the main artery of the limb, the **femoral artery** (fig. 13, 1),

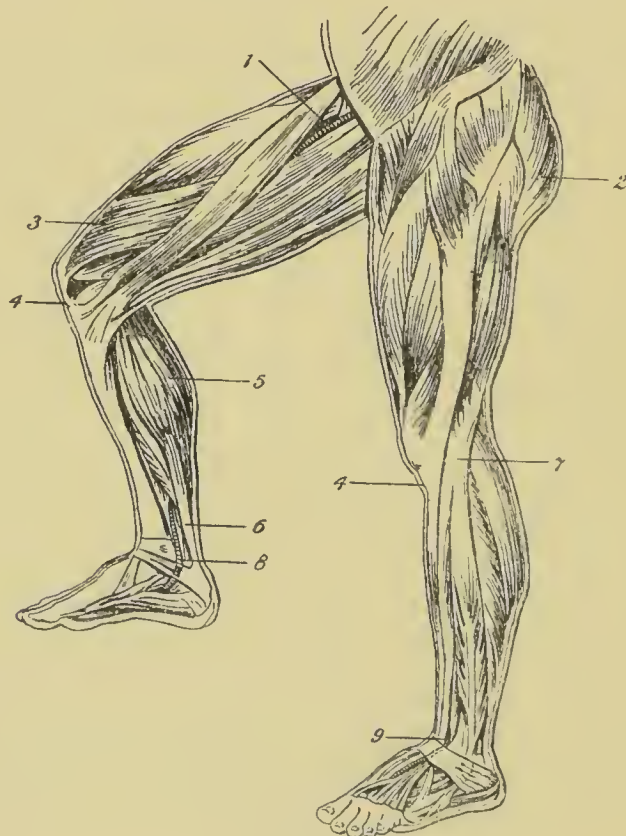


FIG. 13.

1. Femoral artery. 2. Gluteus maximus. 3. Extensor muscles. 4. Tubercle of the tibia. 5. Muscles of calf. 6. Tendo achillis. 7. Head of fibula. 8. Posterior tibial artery. 9. Lower part of anterior tibial artery.

and it is best compressed just below this furrow. The artery lies close to the surface for the first three inches, then becomes

overlapped by a muscle, and three-quarters of the way down the thigh pierces the muscles to get to the back of the knee. Just below the furrow, and lying over the upper part of the artery, are numerous lymphatic glands which become swollen in certain affections of the foot and leg, buttocks, and genital organs. The thigh-bone (*femur*) is deeply embedded in masses of muscles, and only the prominent boss of bone (the *great trochanter*, fig. 4, 5) and the broad knuckle-like lower end (*condyles*) can be felt under the skin. The front and outer side of the femur is covered by a group of muscles which run down to be inserted into the knee-cap; these straighten the leg. The inner side of the thigh is formed by very strong muscles which draw the knees together as in riding. The prominence of the buttock is caused by a very thick muscle (**gluteus maximus**, fig. 13, 2) which brings the bent thigh into line with the body as in going upstairs, getting up from a sitting position, and straightening the body after stooping.

The great nerve to the leg (the **great sciatic**) runs in a straight line down the back of the thigh; prolonged pressure on this nerve gives rise to the sensation known as 'pins and needles,' and of weakness and numbness in the leg and foot. The muscles at the back of the thigh, the 'ham-strings,' bend the knee. All the muscles of the thigh acting together enable the lower limb to support the great weight of the body steadily when walking and running.

The knee.—The front of the knee-cap (*patella*) lies under the skin, a bursa being interposed, and to its upper edge and sides are attached the *extensor muscles* (fig. 13, 3). From its somewhat pointed lower edge a strong ligament runs down, and is inserted into a bony projection (the *tubercle* of the *tibia*, fig. 13, 4) on the upper part of the shin-bone; this ligament is covered by a bursa, and has another situated beneath it. The under surface of the patella rests against the lower end of the femur, shifting its position according to the degree of flexion and extension of the leg. It affords protection to the knee-joint; sharp instruments penetrating the surrounding soft parts enter the cavity of the joint directly, a most serious injury. On each side of the patella the condyles of the femur can be felt, and below the condyles a groove which marks the situation

of the cartilages lying between the femur and tibia. After injury to the knee the inner cartilage is sometimes squeezed partially out from its place between the bones, and instead of a groove a prominence is felt; this rarely happens to the outer cartilage. A deep hollow, the ham (or **popliteal space**) is felt behind when the knee is bent, formed by the projecting tendons of the ham-string muscles on each side. In this hollow lie the vessels and nerves to the leg embedded in fat; the artery, the continuation of the femoral artery, lies in the centre of this space.

The leg.—The shin-bone (*tibia*, fig. 4, 3) can be felt lying under the skin on the inner surface of the leg from the knee to the foot. Note how sharp the front edge of the bone is, and how easily it could, when broken, be forced through the skin. The prominent head of the outer bone (*fibula*, fig. 4, 4) can be felt just below and rather behind the knee-joint. Its slender shaft is embedded in muscles for rather more than half its length, but below it comes near the surface, and the lower end forms the outer projection of the ankle. The muscles in the front of the leg turn the foot up towards the shin and extend the toes. At the back of the leg the prominent calf muscles terminate in a tendon (the **tendo achillis**, fig. 13, 6) inserted into the heel. These raise the heel, as in standing tiptoe. Beneath the calf muscles lie a deeper set which point the toes, and as they pass under the bones of the instep help to maintain the arch of the foot. The muscles on the outer side of the leg help those of the calf to raise the body on the toes and also steady the ankle. The arteries of the leg, the **anterior** and **posterior tibials**, are so deeply seated above as to be rarely injured except by stabs or when the limb is crushed, but they become more superficial at the ankle. The position of the **anterior tibial artery** is indicated by a line drawn from a point midway between the head of the fibula (fig. 13, 7), and the tubercle of the tibia (fig. 13, 4) to a point midway between the outer and inner projections of the ankle. Pressure may be applied at the latter point for wounds on the back of the foot, but above the artery lies too deeply placed for pressure to be effectively applied. The **posterior tibial artery** (fig. 13, 8) runs from the mid point of the ham to a point midway between the bony projection on the inner side

of the ankle and the centre of the rounded edge of the heel. It is covered by the calf muscles above; at the ankle it lies under the skin and divides into two branches which dip into the sole of the foot, lying close against the bones and thickly covered by the soft parts.

The foot.—Note the hollow on the inner side of the sole formed by the heel-bone behind and the bones of the instep in front. This arch, which gives spring to the foot, is kept up by ligaments which unite the bones, the tendons from the muscles of the leg, and the short muscles of the sole. On the outer and upper surface of the foot, in front of the external bony projection of the ankle, is a short muscle which extends the toes. This muscle lies just beneath the skin, which is very thin on the back of the foot, and when noticed for the first time is occasionally mistaken for a swelling due to injury. The artery on the upper surface of the foot runs from the centre of the ankle-joint over the bones of the instep, and dips down between the bones of the great and second toes to join the vessels in the sole. Hence, in wounds of the sole, the arteries at the front and on the inner side of the ankle must both be compressed.

PART II
HYGIENE

CHAPTER I

THE HYGIENE OF OUR BODIES

Microbes—Food—Exercise—Clothing—Rest—Washing and Bathing.

HYGIENE is the science and art of preserving health. The body in a normal state has a natural tendency to resist disease ; this is commonly called ‘vital resistance,’ and it is the study of those conditions which tend to raise or depress our vital resistance which constitutes the science of hygiene. It is well known that certain diseases often attack several members of one family, that others attack the young, and others again the old. This shows that vital resistance does not exist to the same degree in everybody, and varies at different ages. No matter how careful we are we cannot absolutely prevent disease, but our aim is to put the body in the best condition to withstand it altogether if possible ; if not, to support its ravages. The following conditions have long been recognised as the chief factors which pave the way for disease.

1. Bad food and water.
2. Foul air.
3. Fatigue.
4. Prolonged exposure to heat, cold, and damp.

The laws of hygiene are the outcome of years of observation and experience, and it is only recently that scientific reasons have been found for them. To Pasteur and his followers we owe our present knowledge, imperfect though it still is, of certain minute bodies which play so important a part in our daily life. These bodies are known under the names of *microbes*, *germs*, *bacteria*, *bacilli*, or *micro-organisms*. In this book they will be spoken of as **microbes**, which means small living things.

Microbes belong to the vegetable kingdom, being varieties of fungi or moulds, and exist in various forms, straight short rods, curved rods, oval, or round bodies. They vary in size, but none of them can be seen without the aid of a powerful microscope. For the most part they multiply by dividing into fragments; but some also deposit spores, and these spores are far more difficult to destroy than the full-grown microbe.

Like plants, they require food in one form or another, moisture, and most of them require a certain amount of air.

Their growth is favoured by darkness and rest, and a temperature equal to that of the human body (98.4° F.) is most favourable to them. Sunlight is extremely injurious, and pure fresh air unfavourable to them. They are usually dormant when exposed to great cold, and are destroyed by boiling and certain chemical substances and gases.

They exist in one form or another almost everywhere—in the air, in water, in the earth, in the dust of dwellings, on the surfaces of our bodies, especially where the skin forms folds (as in the fingers by the side of the nails), in the nose, mouth, and throat, and throughout the intestinal canal. Fortunately only comparatively few of the many varieties are capable of producing disease in man; the majority are quite harmless, and there are good reasons for thinking that many are distinctly beneficial if not indispensable to man.

The majority of them are destroyed or rendered harmless directly they enter the body; others enter and multiply, provided that the body is in a condition favourable to their growth. Some varieties, having obtained a foothold and caused disease, die very soon after leaving the body of their host, and can only spread disease when conveyed from one person to another by direct contact, so causing what is known as a ‘contagious disease.’

Others, endowed with greater vitality, live for a longer period without a host, can be carried from person to person until one is found in a fit state to receive them, and so cause ‘infectious disease.’

This brief description of microbes has been here placed in order that the following chapters on hygiene may be more

readily understood. The subject has been divided and placed under two headings—

First: The Hygiene of our Bodies.

Second: The Hygiene of our Surroundings.

FOOD

Man requires food to supply materials for growth in early life, to restore the tissues which are constantly undergoing wear and tear, to supply the structures which produce movement, and to keep up the heat of the body.

From the cradle to the grave he requires:

1. Substances variously termed *proteid*, *albuminous*, or *nitrogenous* food, which will hereafter be referred to as **proteid**. This is mainly derived from the flesh of animals, and is all-important, helping the other foods to form flesh, and stirring up the vital processes occurring in the body. Without the proteid element the other foods are useless.

2. Fats derived from animals and certain oily vegetables.

3. Starches or sugary substances mainly derived from the vegetable kingdom. These two, aided by the proteids, are essentially energy and heat producers, and also form flesh. If taken in excess, especially the starches, they are stored up in the body as fat.

4. Salts, of which the common table salt (sodium chloride) is the principal, but the salts of potassium, lime, iron, phosphorus, and magnesia are also required. These are taken either in their mineral form or as constituents of meat and vegetables. In some way, not clearly understood, they direct the vital, especially the nervous, processes occurring in the body. Without them an animal becomes weak and ill.

5. Water.

If any one of these constituents of ordinary diet is altogether omitted, a man soon becomes ill and ultimately dies.

The amount and proportion of these substances he requires vary within very wide limits according to his age, surroundings, and mode of life. The same conditions will also influence what form of food suits him best. The outdoor labourer requires an amount of food, and that in a form which would make a clerk leading a sedentary life ill.

Most foods are rich in one or more of the elements, poor in

another. Few contain all the elements in such proportions as to maintain the body in health; if it does it is called a 'perfect food,' though not suitable to all conditions of life. Milk is a perfect food admirably adapted to the young child and the adult in certain conditions; but if the field labourer lived entirely on milk, and took enough to satisfy him and enable him to do his work, he would become enormously fat. For him bread and cheese and fat bacon is an excellent diet well suited to his digestion. Cheese contains a large amount of proteid, but is poor in fat, which the bacon makes up for, and the bread supplies the starches; but if the same diet were given to a young child or an invalid it would pass through the intestine almost unchanged, owing to the irritation produced in the intestine. In considering the value of a food two things must be considered—

1. The amount of nourishment contained in it.

2. Whether it is easily digested, *i.e.* whether the digestive juices can act on the food and the body appropriate and make use of the nourishing substances contained. It is as futile to swallow food which passes through the intestine undigested as it is to fill a grate with flints, bricks, and other incombustible material, and expect the fire to burn.

With regard to the quantity of food required, it has been determined by careful observation that a man leading a laborious life requires about 50 oz. of solid food and from $2\frac{1}{2}$ to 4 pints of water a day.

The solid food is made up of—

Meat (cooked and free from bone)	.	.	.	$\frac{3}{4}$ lb.
Fats	.	.	.	4 oz.
Starches	.	.	.	2 lb.
Salts	.	.	.	1 oz.

As meat loses a good deal in cooking, and bone is usually plentifully supplied by the butcher, one pound of raw meat should be allowed per head.

A man leading a sedentary life requires about two-thirds of this quantity, and a man at absolute rest, half.

We may now mention the more common articles of diet, and briefly refer to their constituents and relative digestibility.

I. Animal food.—1. *Milk* has been already mentioned as being a perfect food, in that it contains all the necessary elements, but the proportions of these vary in the milk secreted by various animals. Human milk contains much less proteid and rather more sugar than cow's milk, as may be seen in the following table :—

	Human	Cow's milk
Proteids	1	3
Fats	4	4
Sugar	7	5
Salts	2	5
Water	87	87

Human milk is alkaline, cow's milk slightly acid. If fed entirely on milk an infant during the first three weeks of life requires about 8 oz. of milk (diluted with twice the quantity of water, total 20 oz.) a day, a child from six months to a year old, $1\frac{1}{2}$ to 2 pints, and an adult if confined to bed, 3 pints, in the twenty-four hours.

Unfortunately milk readily undergoes decomposition, has the power of absorbing noxious gases, and is an extremely favourable soil for microbes to flourish in. It is liable to contamination in many ways :

(1) By the cow being diseased, especially when suffering from tuberculosis and having ulcers on the udders; or the udders may be smeared with the animal's excrement.

(2) By dirt or disease of the hands of the person milking the cow.

(3) By pails and other receptacles for milk being imperfectly cleansed, or washed with water already contaminated.

(4) By exposure of the milk to sewer gas or dust, or by keeping it in houses where scarlet-fever or diphtheria is present, or by storing it in a damp, foul atmosphere, such as often exists in a London larder.

(5) By adulteration with various substances, or the addition of boracic acid to keep it from turning sour. Boracic acid does not always cause bad effects, but may depress the circulation and temperature, and set up irritation in the stomach and intestines.

By boiling, milk is rendered more easy of digestion, and its liability to communicate disease is destroyed, but for this to

be performed effectually it must be boiled for at least half-an-hour. Fresh milk has the property of preventing scurvy, and unfortunately there is good reason to believe that this property is to a large extent lost by prolonged boiling. 'Scalding' milk, *i.e.* heating it to boiling point for a few seconds, is probably sufficient for all practical purposes, unless the milk is going to be stored.

2. *Butter* consists almost entirely of the fat of milk, with some added salt to make it keep.

3. *Cheese* consists of the proteid substances of milk with a variable quantity of fat. Cheap cheeses are made from skimmed milk, and are therefore almost destitute of fat, but are highly nutritious, though difficult to digest.

4. *Eggs* are a 'perfect' food, being especially rich in proteids and fats, though poor in starches. When lightly boiled or raw they are easy of digestion.

5. *Meat* contains proteids in large quantities; the fats vary according to the condition of the animal, but well-fed butcher's meat usually consists of fat to the extent of one-quarter; salts are present, chiefly the chlorides and phosphates of potash, and starches are almost absent.

Dr. Louis Parkes gives the following directions in inspecting meat. The muscles should be firm and elastic and of a deep red colour—not purple nor pale—and marbled with fat. It should not be too moist, and there should be no collection of fluid between the muscles. The odour should be fresh and not unpleasant, without a suspicion of putridity or smell of physic. Meat which has commenced to putrefy is pale and soft, later it becomes green. If putrefaction is suspected a knife should be thrust into the meat and then held to the nose, or a little of the meat may be chopped up and soaked in warm water. The fat should be firm and of a pale yellow colour, free from blood spots.

Mutton is very nutritious, and easily digested.

Lamb is more tender, but less digestible and deficient in fat.

Beef, extremely nutritious, less easily digested than mutton.

Veal, less nutritious and less digestible than beef.

Pork, highly nutritious, rich in fat, extremely indigestible.

Sweetbread, very nutritious, and easily digested if plainly cooked.

Liver, kidney, and heart, all nutritious, but indigestible and not desirable food.

Tripe, nutritious and easily digested, but tasteless.

Bones are very valuable as a basis for soup. They should be chopped or crushed with a mallet into small pieces, and boiled for six hours at least.

Calf's-foot jelly, a useful variation to the monotonous diet of an invalid, but not very nutritious.

Poultry and game are easily digested, but are deficient in fat. Much depends upon how they have been fed.

Geese and ducks, very nutritious, but liable to disagree with delicate stomachs.

6. *Fish*.—Most fish are deficient in fat, but are otherwise very nutritious and valuable food.

Eels, herrings, and sprats are all fatty and liable to disagree.

Mackerel must be eaten absolutely fresh.

Salmon is very nutritious and rarely disagrees by itself; its evil reputation has probably been acquired by its companion dishes and wines.

Shell-fish are all nutritious, but disagree with many people. The claws of the lobster are more easily digested than the body.

Oysters and mussels are dangerous if the beds from which they are taken are contaminated with sewage; it has been clearly shown that typhoid fever has been contracted by eating them.

II. **Vegetable food**.—1. *The Cereals*.—Wheat, rye, barley, oats, maize and rice are all rich in starch, but poor in fats. They all contain proteids, wheat containing the most (20 per cent.), rice the least (7 per cent.). Unfortunately, nearly the whole of the proteid element is lost in making the finest flour, as it is cast aside with the bran. Wholemeal flour is far more nutritious, but less easily digested by some people. The deficiency in fats is usually supplemented by eating some form of fat with them, butter, dripping, or bacon.

Cakes eaten hot with butter are most indigestible; the melted fat forms a coating over the starch and prevents the penetration of the digestive juices.

Macaroni and vermicelli should be thoroughly boiled, and

are then easily digested and excellent food if taken with milk or soup.

2. *The Pulses*.—Beans, peas and lentils are less digestible than the cereals, and require more cooking, but are rich in proteids and valuable food for the labouring classes.

3. *Roots and tubers*, the chief of which is the potato, consist almost entirely of starch and some salts. They are almost devoid of proteids, but are valuable in preventing scurvy.

4. *Green vegetables* contain but little actual food, and consist almost entirely of water and indigestible woody fibre, but they contain salts of the greatest value to the animal economy, and are useful from their aperient action on the intestine.

Rhubarb is on the whole a most undesirable plant. It contains large quantities of oxalates of lime and potash, which irritate the kidneys, and have been known to cause serious conditions.

5. *Fruits* consist chiefly of water, sugar, and the vegetable salts and acids. The skin and the seeds of fruits such as the raspberry and blackberry are indigestible, and pass through the intestine intact. The minute yellow seeds on the outside of a strawberry often set up intestinal irritation in children.

6. *Farinaceous foods*.—Sago, tapioca, and arrowroot consist almost entirely of starch.

III. Fluid food.—1. *Water* is not actually a food, but an all-important constituent of the body, and a medium of exchange. The human body consists of water to the extent of rather more than one-half. For food to be digested and absorbed, and the products of combustion to be excreted, water must be present. It is continually being given off from the lungs as vapour, from the skin as sweat, and from the kidneys as urine. One pint of water is usually taken as a constituent of solid food daily, and, in addition to this, the body requires from three to four pints in the form of liquid.

2. *Tea and coffee*.—The stimulating properties of these beverages are due to substances called theine and caffeine, which are practically identical. Taken in moderation they stimulate the nervous, vascular, and muscular systems; but in large quantities they cause restlessness and tremor. They both contain tannin, which combines with proteid food and renders it less easy of digestion; hence they are best avoided at meals

when meat is eaten by people of delicate digestions. The question often arises whether tea should be taken in the early morning before getting up. The answer depends upon whether it interferes with the appetite for breakfast or not. The stimulating properties of tea make some people feel that they do not want breakfast, and the result is they start the day's work with an empty stomach, and, consequently, an enfeebled body, and the habit of early tea-drinking is undoubtedly injurious to them. Taken as a preliminary to active exercise before breakfast, it is probably beneficial, and prevents undue fatigue.

Cocoa is far more nutritious than tea or coffee, containing a large quantity of fat.

3. *Alcoholic drinks*.—In estimating the advantages and evils of alcoholic fluids too much stress is usually laid on the properties of alcohol and too little notice taken of the other constituents, and the effects which they produce. Taken in moderate quantities alcohol is a food, being utilised itself and sparing the other constituents of our daily diet. It stimulates the heart and nervous system, dilates the capillaries, giving a sensation of warmth to the body, and aids digestion by promoting the secretion of the digestive fluids. Probably its most valuable property is that men like it, and it proves a pleasant adjunct to a meal. Theoretically, a healthy man leading a healthy life requires no alcohol, and the young are certainly better without it under ordinary circumstances; but practically, under modern conditions of life, few men are injured by consuming a small amount of alcohol, and the majority are distinctly benefited by it.

It is hardly necessary to say that alcohol should be taken in extreme moderation; two ounces in the twenty-four hours is the maximum quantity which may be taken by a healthy person.

The following table shows the percentage of alcohol in various fluids, and the quantity which contains the two ounces :—

	Percentage of alcohol (approximately).	Quantity containing 2 oz. of alcohol (approximately).
Spirits	55 p.c.	$3\frac{3}{4}$ oz. <i>i.e.</i> 7 tablespoonfuls.
Sherry and port . . .	20 p.c.	10 oz. <i>i.e.</i> $\frac{1}{2}$ pint.
Claret and Burgundy . .	12 p.c.	17 oz. <i>i.e.</i> $\frac{3}{4}$ pint.
Champagne	10 p.c.	20 oz. <i>i.e.</i> 1 pint.
Heavy beers	8 p.c.	25 oz. <i>i.e.</i> $1\frac{1}{4}$ pint.
Light ale	3 p.c.	66 oz. <i>i.e.</i> $3\frac{1}{4}$ pints.

Alcohol should only be taken at meal-time. Taken between meals it is a poison irritating the digestive organs and preventing them from responding to the calls of the system when food is taken. The promiscuous brandy-and-soda, and the glass of port wine taken between breakfast and lunch, cannot be too strongly condemned. In cold weather alcohol should only be taken after the day's work is done, when the body is sheltered, and never before or during exposure with the idea of 'keeping the cold out.' By dilating the capillaries a sensation of warmth and comfort is imparted to the body on a cold day, but this is due to an enormous amount of heat being lost to the body, and is of brief duration; and there is no surer way of lowering the vitality and inviting disease.

Meals.—These must be arranged according to the surroundings of the individual, and it is as well to take the principal meal when a short period of rest can be indulged in afterwards; but if a meal is followed by a feeling of heaviness and disinclination for exertion, either mental or bodily, it may be taken for granted that something is wrong with the food as regards quantity or constituents, or with the digestion. A healthy child enjoys his simple meals and wants to romp about directly afterwards; and a robust man usually makes a good breakfast, and immediately starts off on his day's work. However the meals are arranged, they should be at regular intervals, and nothing taken in between. The stomach requires intervals of rest, and if a fresh quantity of food is introduced whilst digestion is going on, the whole process is upset. Amongst the upper classes a child is frequently stuffed with food by over-anxious parents, with the result that the digestive tract is over-worked; the food, if not vomited, is hurried along undigested and unabsorbed, leaving the body almost as it entered it, and the child becomes thin and weak through semi-starvation. It is of great importance that the diet should be varied and made palatable; food which is swallowed with dislike is usually badly digested.

Special diets.—*Diet for training* differs but little from an ordinary wholesome diet; but the quantity of food must be increased, especially the proteids and fats, and the body requires

a larger quantity of water. This is best taken in the early morning and last thing at night. The diet should be varied as much as possible, and fresh ripe fruits may be taken freely. Soups, curries, pastry, new potatoes, and spirits must be avoided. If a man is a smoker, under ordinary circumstances, one pipe after the last meal, when the day's work is done, may be indulged in. If a man is sensibly trained, the digestion improves so much that almost every particle of nourishment is extracted from the food, carried to the muscles, and given off in the form of energy. Training should be abandoned as gradually as it was begun. Usually, when the period of training is over, exercise is almost abandoned, and no need for moderation apparently existing, the quantity of food taken is greatly increased. The digestion is at first as active as before, and the result is that the late athlete finds his body loaded with fat.

Diet to reduce corpulence.—A tendency to the formation of an excessive amount of fat is sometimes hereditary, and may occur in small eaters, without any obvious errors in the manner of living. Obesity is, however, usually due to the amount of food taken being in excess of the requirements of the body. High living, with a too liberal allowance of alcohol, and want of exercise, are the common causes. To reduce fat, active exercise must be taken, starchy food reduced to a minimum; sugar and alcohol are best avoided entirely, but a little light wine may be taken, and meat and fat in moderate quantities. As little fluid as possible should be drunk with the meals, but water may be freely taken in the early morning and on going to bed. Thin well-browned toast and hard biscuits should be substituted for bread. Milk, soups, and potatoes must be taken sparingly. Stewed fruits and jams must be avoided on account of the sugar; fresh vegetables and fruits may be taken. Pastry and all forms of milky and farinaceous puddings must be avoided. Not more than three meals should be taken in the twenty-four hours. An early breakfast, consisting of toast and butter and a small quantity of tea without milk or sugar. At dinner, meat, fish, poultry or game, with green vegetables and fruit. A glass of claret or lemonade. At supper, eggs or fish with toast or biscuits and butter. The actual quantity of food must depend on the physical development of the individual and the amount of exercise taken.

EXERCISE

During exercise the heart's action is increased both in force and frequency, and the blood conveys food to and waste products away from the tissues more rapidly than when the body is at rest. Breathing becomes more rapid and deeper, larger quantities of air are drawn in and expelled, and a free interchange of oxygen and carbonic acid takes place. The muscles produce more heat, and the skin perspires freely, thus regulating the temperature. If a man takes too much food and too little exercise he becomes fat, short of breath on slight exertion, sallow in complexion, and mentally irritable. His rotund figure is due to the muscles being wasted and accumulations of fat beneath the skin. His shortness of breath is due to a variety of causes, which react on one another:—

1. His muscles are feeble, the muscular walls of the heart sharing the general weakness, and his weight is increased.

2. His blood is imperfectly aerated owing to his feeble heart, and the deficient expansion of his lungs.

His muddy complexion and unhappy mental condition are due to the retention of certain substances in his blood which would otherwise be excreted by the skin and other glands. The form of exercise must needs vary according to age and surroundings. Continuous unvaried exertion is unsuitable to the very young, and sudden strains are dangerous to those past middle age. Young children are soon exhausted by steady walking, but if allowed to get over the ground in their own way, which usually takes the form of a series of short runs and romps, they will cover long distances without fatigue. For brain workers prolonged dull walks are not nearly as beneficial as some exercise which demands the whole attention and diverts the mind from ordinary routine. Exercise should be taken in as pure an atmosphere as possible, either out of doors or in large well-ventilated rooms. Those who dwell in the country have some form of outdoor amusement at hand both winter and summer, but the inhabitants of large towns are much handicapped, especially during the winter months. For the latter the bicycle has become a great resource, and golf, especially for the middle aged and more leisured classes, during the summer; but in winter, except for the brief skating season, they must take their

exercise indoors or abandon it altogether. Gymnasia are fairly numerous but ill-frequented. Dumb-bells and Indian-clubs are excellent forms of exercise, but are apt to become tedious, and the horizontal and parallel bars are too severe for most men. It is a matter for regret that foil-fencing is so little practised in this country. The art once acquired in early life, or at any rate before the fortieth year, can be safely indulged in till quite an advanced age; it is practically free from risk, claims the whole attention, exercises the body from the eyes to the finger-tips, and the innumerable combinations of movements render it an endless source of interest.

Parents often ask whether their boys should play violent games such as football, dwelling on the risks of serious injury and forgetting the valuable mental training of indifference to bodily pain and danger, control of temper, and the habit of making rapid decisions when surrounded by difficulties.

As age advances the man who was once an athlete should not abandon all exercise, but resign himself to the more gentle forms; he must pay heed to his palpitating heart and shortness of breath, and refrain from emulating younger men of far worse physique.

CLOTHING

Civilised man is too prone to regard dress as a means of veiling or increasing the beauties of the human form and to neglect the more important functions of conserving the heat of the body and keeping out the heat of the sun's rays. This is no place to enter into the æsthetic properties of clothing, and we are only concerned with its use as regards health. The qualities which dress materials should possess are: 1. Warmth; 2. The property of absorbing moisture; 3. Porosity, or ventilating properties; 4. Imperviousness to the sun's rays; 5. Imperviousness to rain.

For clothing to be warm it is essential that the fabric should be loosely woven so that it contains minute air-spaces, and that it should not fit the body too closely. Air is a bad conductor of heat, and the interval between the skin and the garment and the air-spaces in the fabric are obstacles to the escape of heat. For coolness the same conditions still hold good, and in addition the clothing should be of a light colour, which absorbs the sun's rays least.

It is now well recognised that woollen garments are the best

protection against chills in cold climates and heat-strokes in the tropics, and possess all the qualities enumerated above except that of keeping out rain. Unfortunately, owing to the minute hairs which project from the surface of a woollen material, it is liable to irritate the skin to a degree which is quite intolerable to some people. This may be obviated by wearing a vest made of cotton gauze or net next the skin, and the woollen garment over it. Merino, a mixture of cotton and wool, is less irritating than materials made of pure wool, but after repeated washing the wool tends to disappear and only the cotton remains. Silk garments are warm because silk is a bad conductor of heat, but its power of absorbing moisture is very slight, and if free perspiration occurs much discomfort results. Linen is the worst form of clothing. Waterproof garments present the serious evil of not permitting the escape of the perspiration from the body, and consequently, if active exercise is taken with a mackintosh on, the clothing soon becomes saturated and as wet as if no protection against the rain had been worn. When taking hard exercise in the rain it is a good plan to put on a mackintosh only when resting, or during the drive home, if this has to be taken in the wet clothes. There is little risk of taking cold whilst moving about, and when sitting the mackintosh prevents the rapid evaporation of moisture and consequent chilling of the body. It is hardly necessary to state that clothes which have become wet either by perspiration or rain should be changed on the first opportunity, and not allowed to dry on the body.

The various articles of clothing may now be specially considered.

Head-covering.—A hat should be light, and fit the head comfortably without undue pressure on the skull at any point. The crown should be some distance from the top of the head, the space affording warmth in winter and coolness in summer. The brim should be broad, so as to shade the eyes, temples, and back of the neck, and to shoot off the rain, preventing it from dripping down the face and neck.

Collars should be loose, and on no account constrict the neck. This point must particularly be attended to in young boys, who constantly outgrow their collars.

Clothes should be suspended from the shoulders, and not

round the waist. If a belt is worn it should encircle the body below the haunch-bones.

Stays, from the standpoint of health, should be altogether abandoned. It is the custom to swathe infants in a stiff linen material, with the idea of supporting their backs. This is a barbarous custom handed down from time immemorial by the grandmother to the young mother. Fortunately, no support is actually given to the back, or the young growing spine and muscles of the infant would be considerably weakened, but respiration and the movements of the abdomen are interfered with, and much childish misery caused. The habit of tight-lacing, as practised by adults, is a form of lunacy deaf to reason, remonstrance, and entreaty. It is quite useless to point out that circulation, respiration, and digestion are all deranged by it, but it may be as well to mention that tight-lacing ultimately produces a peculiarly coarse and congested condition of the features, which is usually attributed to alcohol, and cannot be concealed by the most lavish use of pearl powder or other cosmetics.

Garters should not be worn, as they obstruct the return of the blood from the feet and legs, and tend to produce varicose veins. If suspenders cannot be used, garters are less harmful if placed below the knee and made of soft material, such as list or a skein of wool.

Boots and shoes.—The human foot in a well-developed adult is the same length as the individual's forearm, and the boot which protects it should be considerably longer. The toe and sole should be broad; the under-tread also broad but flexible, so as to prevent the foot being on a rigid splint. The heel should be broad, square, and not exceed three-quarters of an inch in height. High heels strain the ankle and the muscles of the calf. For hard work in hot weather a porous sole inserted in the boot absorbs the perspiration of the foot and gives much comfort.

REST

Rest is as essential to the body as exercise, but it is impossible to lay down the law as to how many hours' sleep an individual ought to have, this being largely dependent on age, habit, and occupation. Eight hours is probably the average

allowance for healthy men leading active lives. Too much sleep is undoubtedly enervating; too little ultimately causes exhaustion. The conditions mentioned here are those which tend to refreshing sleep. The most important is the habit of retiring to rest at the same hour each night. The bedroom should, if possible, face east or south-east, so as to get the early morning sun, but be cool when the evening comes. The bed should be placed so that the sleeper is not in a draught from the window, door, or fireplace, and the face should be away from the light. Fresh air is even more important to the body during sleep than when up and about, and the habit of sleeping with an open window is most conducive to health. In some parts of the Highlands the inhabitants suffer in large numbers from consumption; they lead the healthiest lives and breathe the purest air during the day, but sleep in close, ill-ventilated cabins at night, and it is undoubtedly due to this that they fall victims to disease. But it is not only the poor and ignorant who err in this respect. The spacious bedrooms of the wealthy are often so shut up that the atmosphere is almost overpowering to the doctor who has been summoned in the early morning, and feels the contrast on entering it after the fresh air he has just been breathing on his way to the house.

For lighting a bedroom, candles are preferable to gas. Feather beds should be avoided, and a hair mattress on a spring frame used instead. The bed-clothing should be light but warm; three thin blankets are better than two thick ones, and the heavy, impervious counterpane which keeps the dust off the bed-clothes during the day should be turned down at night. To induce sleep it is essential that the feet should be warm. Those who suffer from cold feet at night should use felt or flannel-lined slippers in their bedrooms, and there is no reason why a hot-water bottle and night-socks should not be used on first getting into bed, but they should be discarded before going to sleep, as soon as the feet and bed are warm. If several hours have elapsed since the last meal was taken, some light food, such as half a cup of warm milk and a biscuit, should be taken on getting into bed. Hunger is a common cause of wakeful nights, and warm food the most valuable of all sleeping draughts.

WASHING AND BATHING

In the chapter on Anatomy and Physiology the functions of the skin have been indicated, and it has been shown that the skin is a gland possessing various important functions. If cleanliness is neglected the skin becomes coated with the solid constituents of the sweat, with oily matter, and with the *débris* of the superficial layers of the skin itself and of the clothing. Thus the pores of the skin become obstructed, and their powers of excretion impaired. It is possible to wash the skin to an excessive degree, and some skins become irritated by the too frequent application of soap. Soaps are made by boiling animal or vegetable fats with an alkali, either soda or potash, soda being usually used in manufacturing hard soap, potash in soft soap. Cheap soaps contain an excess of alkali, removing the natural grease of the skin too much, and making it harsh and irritable. It is the alkali which combines with the grease of the skin, and enables it to be washed off with water.

The baths in common use are—

1. The hot bath, the water being at a temperature of from 98° F. to 104° F. This should not be indulged in too frequently—once or twice a week is quite often enough—and should be taken immediately before going to bed. Few things are more enjoyable for the moment, or more enervating in the long run, than lying soaking in a hot bath before breakfast.

2. The tepid bath, 80° F. to 90° F.—the latter being the better temperature for young children—may be taken daily.

3. The cold bath, 40° F. to 60° F., is an excellent tonic for most people, and those who take one daily are less likely to catch cold. A sense of well-being, cheerfulness, and warmth follows if it agrees; those who feel chilly and miserable afterwards may take it as an indication that it does not suit them. No one should stay in a cold bath more than three minutes; the body should be soaped before entering the bath, and on getting out it should be rapidly dried with a rough towel, and the clothes put on as quickly as possible. During the reaction which follows a brief immersion in cold water the capillaries of the skin are dilated, and much heat given off and lost, unless the surface of the body is covered.

The refreshing effect of a bath is well known, and a night

spent out of bed causes much less discomfort on the following day if the morning bath can be taken at the usual time.

In preparing a warm bath for invalids or children, the temperature must always be taken with a thermometer, as the sensation of warmth imparted to the hand is quite fallacious; the hand feels comfortably warm in water which is intolerably hot to the rest of the body. Another most important point is that the cold water should always be placed in the bath first, and the hot added gradually until the thermometer rises to the desired temperature. If this were always done, the number of scalded children would be reduced by a half, and many lives spared.

In river and sea bathing we get the advantages of cleanliness and exercise combined. Swimming is one of the best forms of muscular exercise, but its delights tempt the unwary to expose the body too long. So much heat is produced by the muscles in the act of swimming that it is safe to remain in the water for a longer period than in an ordinary bath; but fatigue should be our guide as to how long we may stay in. It is far better when fatigued to come out of the water and dress at once, than to rest on the bank or shore and then continue the bath. At least two hours should be allowed to elapse after a meal before bathing. After active exercise do not wait until the body has cooled, but strip and enter the water at once. It is well known that swimming is an art never forgotten when once acquired, but we commonly forget that unless regularly practised it is a severe strain on the muscles, and the most accomplished swimmers are liable to attacks of cramp if they plunge into cold water and go for a long swim when out of condition.

CHAPTER II

THE HYGIENE OF OUR SURROUNDINGS

Housing—Disposal of Refuse—Water Supply—Ventilation and Warming.

I. Housing.—In selecting a house which is to be our home we should bear in mind how much the future happiness of the household depends on the house being healthy. No wealth or success can compensate for the worry and unhappiness caused by constant ill-health. With regard to the site for a house, Dr. Parkes gives the following table stating the relative healthiness of the various forms of soil.

1. Rock.	4. Limestone.	6. Clay.
2. Gravel.	5. Sandy.	7. Marshy.
3. Sandstone.		

If a house must be built on a damp site, the subsoil must be drained by earthenware pipes, and a layer of concrete 8 inches thick laid over them and extending beyond the ground plan of the house. If possible the house should not face due north and south; in summer the south rooms will be found very hot, and north rooms, in which the sun can never enter, are unhealthy all the year round. In order that a house may be cool in summer and warm in winter, the walls should be thick, and coated inside with cement to prevent the penetration of damp from the outside. The ceilings and floors should be carefully finished to prevent dust accumulating between the joists, and perforated bricks or iron gratings should be inserted in the outside walls to allow free circulation of the air beneath the floors and prevent dry rot. When repairing, all old paper should be thoroughly scraped off and the walls washed down before the new paper is applied. A house should be kept as free from dust as possible. Heavy curtains, and carpets fitting the recesses of the rooms, should be avoided; mats and rugs are

much to be preferred. All heavy furniture should be on castors, so as to allow of its being easily moved and the floor covered by it regularly swept. The larder requires special care; it should be thoroughly ventilated, newly whitewashed at least once a year, and every possible precaution taken against the entry of any emanations from a neighbouring coal-cellar, dustbin, or water-closet.

Any escape of illuminating gas should be immediately attended to. Slight escapes of gas cause sore throat and general malaise, and even cause severe explosions if the gas accumulates. If a strong smell of escaped gas is noticed, (1) extinguish all the lights; (2) open the windows; (3) turn off the gas at the meter; (4) send for a plumber.

II. Disposal of refuse, excretal and domestic.—There are two methods of disposing of excretal refuse: (1) the **conservancy** system, which is rapidly being abolished, but still largely prevails in the country. This consists in the storage of refuse in privies, cesspools, or dry closets, and its periodical removal by scavengers. (2) The **water-carriage** or **drainage** system, which is far preferable, and now exists in most large towns.

The least objectionable form of the conservancy system is the **pail method**. The closet containing the pail must be six feet from any dwelling, and constructed according to the Local Government Board's By-laws. The capacity of the pail must not be greater than two cubic feet; it should be furnished with a close-fitting lid, and be removed and emptied at least once a week. A good supply of ashes, cinders, or charcoal must be kept in the closet, and some thrown in with a scoop after each deposit of refuse. Two pails must be kept, one for use whilst the other is removed.

In the **water-carriage system**, excreta and liquid refuse are carried away in drains and sewers and washed along by flowing water; each house is in connection with one of the main sewers, and it is essential that the somewhat complicated system of pipes and traps should be properly constructed and in good repair, to prevent the entry of sewer gas into the house. Before taking a house, no money is better expended than in getting the opinion of a disinterested expert as to the condition of the drains, and if they have to be altered, in having this done as

thoroughly as possible in the first place, and frequently tested afterwards. The statement of the house agent, that the drains have ‘recently been put in thorough order,’ and an elaborate and highly-coloured plan, framed and glazed, are not proofs that the drains are safe.

The foundations of a new house are liable to sink and derange the pipes, and work excellently planned by the architect

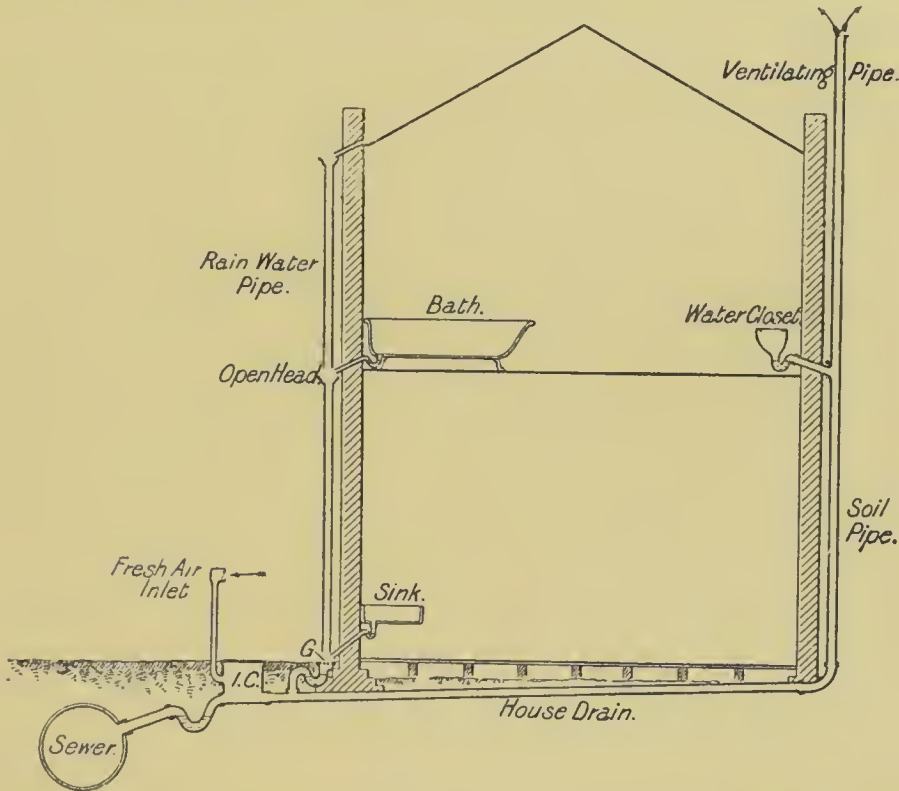


FIG. 14.—DIAGRAM SHOWING THE DRAINS AND WASTE-WATER PIPES OF A HOUSE.

The waste-pipes from the bath and sink are trapped and disconnected from the rain-water pipe, which discharges over a trapped gully, *G*. *I. C.* The inspection chamber closed with an air-tight iron lid. The house-drain is drawn passing under the house; it should be outside if possible.

is often scamped by the builder for the sake of economy, or left half done by a careless workman. Only the barest outlines can be given here of how a house should be drained; but if the reader would have really practical knowledge on the subject, he should consult Dr. Louis Parkes’s short and lucid work on ‘Hygiene and Public Health.’

1. The water-closets should be placed against an outside wall, and the basin should be connected below with an S-shaped ‘syphon’ trap, cutting off the escape of gas from the soil-pipe into the closet. The so-called ‘D trap,’ from its resemblance

to the letter \square placed sideways, and the old-fashioned 'pan closets,' should be everywhere abolished.

2. The soil-pipe which carries the refuse down to the drain and also allows the free entrance or exit of air should be securely fixed outside the house, made of galvanised iron or lead tubing (without seam), and carried well up above the level of the roof and chimneys.

3. The house drain should be, if possible, outside the house, laid with a gentle slope on a smooth bed of concrete. Iron pipes, coated so as to prevent rust, are better than stoneware pipes, which are liable to crack and leak.

4. At the junction of the drain with the sewer, which should always be outside the house, every precaution should be taken to prevent the sewer gas forcing its way into the house drain. This is effected by placing a **S**-trap between the drain and the sewer, and a means of inlet for fresh air into the house drain should be made at this point, so that the air passes freely along the drain and up the soil-pipe, escaping at the upper end above the roof. Whenever possible, an 'inspecting chamber,' fitted with an air-tight lid, should be made at the termination of the house drain at its junction with the trap. The advantage of this is that the drain and trap can be readily inspected and cleaned.

Waste water from baths and lavatories, and rain-water from the roof, must be carried away by separate pipes distinct from the soil-pipe. Waste-pipes from baths and lavatories should all be trapped and discharge into the open head of the rain-water pipe, which should be disconnected below from the drain by discharging over a trapped gulley.

Testing drains for leaks and other defects can only be efficiently performed by skilled hands, but a rough method is to pour half an ounce of oil of peppermint, followed by several gallons of hot water, down the highest water-closet. The smell of the peppermint will be detected in the house if there is a defect allowing air from the drain-pipe to enter the rooms. The presence of rats in a house is usually strong evidence of old brick drains or cesspools existing and communicating with the house. Rats inhabit old sewers and drains, and by making their way through the crumbling bricks form runs into the house, which become channels for foul air.

Domestic refuse.—Only dust, cinders, and dry refuse should be deposited in a dustbin. Moist refuse, such as potato peelings, waste scraps of food, &c., should be burnt in the kitchen fire at the end of every day. ‘Sanitary dustbins,’ which are portable galvanised iron receptacles with well-fitting covers, are infinitely preferable to the old-fashioned fixed dustbins. If a dustbin is used indiscriminately for moist and dry refuse, the contents rapidly undergo decomposition, and it becomes a constant danger to all who come in its neighbourhood.

III. **Water.**—The importance of a free supply of water to man is shown by the fact that in every country, from the remotest ages, all towns have originally sprung from settlements situated near rivers or streams. It has been estimated that to keep a town in health the inhabitants require an allowance of water equal to thirty gallons per head per day, from four to five pints being drunk, and the remainder used for washing and other purposes. Water is obtained from rain, wells, rivers, streams, and springs, and stored for use. It is all-important that drinking-water should be pure, and to ensure this it must be obtained from a pure source, and be guarded from contamination when stored. If, for any reason, the source and storage are open to suspicion, it must be purified before being drunk. We will now briefly consider water as we receive it from the various sources, and then pass on to the storage and methods of purification.

1. Rain, as it falls from the clouds, is at first quite pure, but on its way to the earth it becomes impregnated with various gases, microbes and solid particles floating in the air. It is therefore difficult to store, so as to keep it fit to drink, but is useful for cooking and washing on account of its softness. Water which contains the salts of lime or magnesia in solution is said to be ‘hard,’ and is bad for washing purposes, as they waste the soap and prevent the formation of a lather. Some water contains carbonate of lime, which, on boiling, is deposited on the sides of the vessel in the form of fur, and the water is no longer hard after being boiled, and the hardness is termed ‘temporary.’ By ‘permanent’ hardness is meant that the water contains salts of lime and magnesia, which are not deposited by boiling.

2. The water from wells is usually hard. There are two varieties of wells—shallow and deep. Shallow wells, which are usually less than fifty feet deep, are almost always polluted, and the water must be regarded with the greatest suspicion. Deep wells which perforate chalk, rock, or sandstone usually contain pure water.

3. Rivers and streams remote from the haunts of man usually supply pure water, but are almost invariably contaminated when passing towns and villages.

4. Springs.—The purity of spring water, like that of wells, depends upon whether the water drains simply through the superficial layers of the earth, or whether it issues from beneath a rocky strata. The water from both is usually hard.

Storage of water.—In towns water is usually supplied to the inhabitants more or less purified, and is stored in the houses in cisterns. Every care must be taken that a cistern is made of proper materials and kept clean. Dr. Louis Parkes gives the following instructions:—

(a) The cistern should be of stoneware, slate, or galvanised iron; (b) it should be placed in a light and well-ventilated position, and should be properly covered; (c) it must not be used to flush water-closets, but may supply water to cisterns purposely used for this; (d) the overflow pipe must be carried out into the open air to terminate as a warning pipe—it may end over the open head of a rain-water pipe if the cistern is in an upper storey, or over a trapped syphon gulley if the cistern is near the ground; (e) the cistern should be cleaned out at regular intervals.

Cisterns are too often placed in positions difficult to get at, and even beneath a floor, so that their very existence is forgotten. When a house is furnished by the constant-supply system it is a good plan to have a tap placed as near the main as possible, and the drinking-water drawn solely from this, and not from more distant taps, the water from which has been standing in the pipes.

Purification of water.—Water companies filter water by passing it through beds of fine sand lying upon gravel. The sand is usually about three feet deep, and, as it becomes choked with sediment, the upper layers have to be frequently renewed. In India muddy water is cleared by adding alum (ten grains

to the gallon), which deposits the suspended matters, and the clear water above is then decanted. This increases the 'hardness' of the water, but prevents the filter, which is subsequently used, from becoming choked.

Filters.—The object of filters is not merely to remove gross particles which discolour water, but to remove everything which may cause disease. The most poisonous water from a shallow, polluted well is often clear, bright, and palatable; the microbes which cause typhoid fever and cholera do not affect the appearance or taste of the water in the least. There are many varieties of filters sold for domestic purposes, and it has been proved that the majority of them are not only useless, but when once infected, become hotbeds for the cultivation of microbes, and the water which has passed through contains infinitely more numerous microbes than it did before being filtered. The filter containing a block of charcoal, which ornaments so many sideboards, is one of the worst, and the wise man will prefer to drink the water standing above the charcoal to the water trickling through below. There are two filters which have stood every test, and may be trusted, the Berkefeld and the Pasteur.¹ Contaminated water appears to be sterilised completely by passing through either of these, but it is essential that the directions as to cleaning should be faithfully carried out. Filters should never be neglected or placed in such positions, *e.g.* inside cisterns, that their existence is forgotten. 'What the eye don't see the heart don't grieve,' is a proverb applicable to many hygienic arrangements, especially drains, cisterns, and filters.

When proper filtration is impossible, we can always resort to boiling, and, on the whole, it is best to trust to this. It is not sufficient to raise water just to boiling point, but it must be kept boiling for at least five minutes, when the most polluted water is rendered harmless.

IV. Ventilation and Warming.—A man when at rest requires 3,000 cubic feet of fresh air every hour, and far more when taking exercise. Now, in order that this amount of air may enter a room every hour without causing an unpleasant draught, the room should contain a certain amount of cubic

¹ The Berkefeld, 121 Oxford Street, W.; The Pasteur, 147 Houndsditch, E.C.

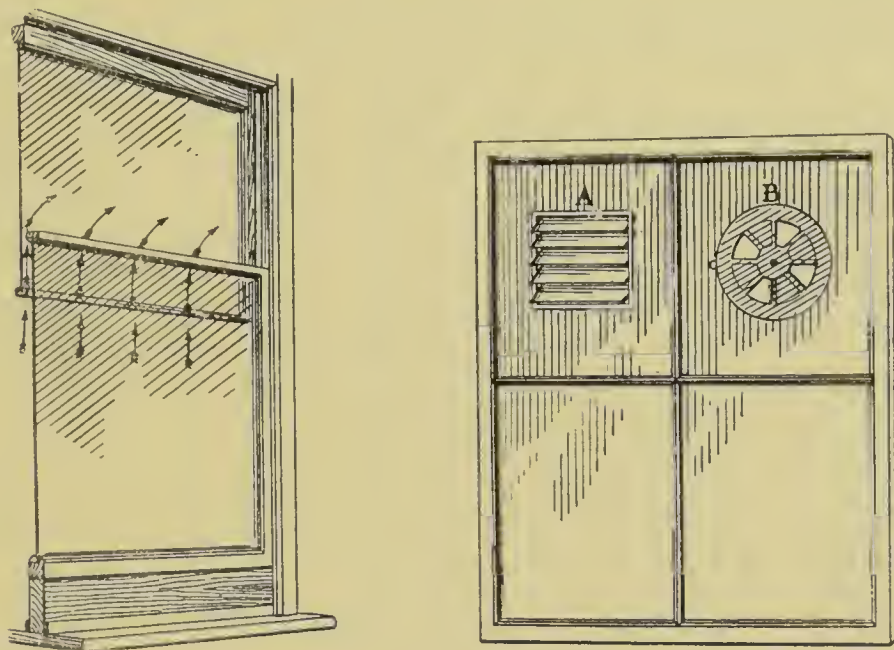
space for each person inhabiting it, and the larger the space the less the draught will be felt. The amount of space allowed in public buildings varies within wide limits, from 360 cubic feet per head in workhouses, to 2,000 cubic feet in hospitals for infectious cases. It has been found that the height of a room does not compensate for lack of floor space, and in calculating the cubic space of a room twelve feet is the extreme height which ought to be considered, no matter how high the room actually is in excess of this. If we strike an average, we find that eighty square feet of floor space is the minimum allowance for each individual occupying it. This will give :—

In a room	8 feet high	640 cubic feet					
„	„	9	„	„	720	„	„
„	„	10	„	„	800	„	„
„	„	12	„	„	960	„	„

It must be remembered that large pieces of furniture, such as wardrobes, occupy much space, and in calculating the size of a room this must be reckoned and deducted.

In ventilating a room we must bear in mind that air as it becomes warm ascends, and cool air descends. There is a constant interchange of air in an ordinary room with that outside by means of the windows, doors, and fireplaces, but by far the greater amount entering by the door rushes across the floor and up the chimney, especially in a warm room. An open window admits the air pleasantly in summer, but in winter causes a draught down on to the heads of the occupants. To avoid draughts fresh air should be admitted above the heads of the occupants, and directed upwards. The simplest and a very effectual way of doing this is Hinckes-Bird's window ventilator (fig. 15). This consists of a board, four inches in depth, placed in the window-frame below and along the whole length of the lower sash. There is an interval thus left between the top of the lower sash and the bottom of the upper, which admits the air in an upward direction. This may be used to ventilate nurseries and bedrooms even in the coldest weather. Fresh air may also be admitted in an upward direction by what is known as 'louvred' panes (fig. 16), or a square of glass hinged at its lower border, and provided with side-checks, may be allowed to fall inwards.

An open fireplace, combined with some means of admitting air from above, is the most effectual way of ventilating a room. The combustion of the fuel sucks in an enormous amount of air, and though the greater part passes directly up the chimney.



FIGS. 15 AND 16.—WINDOW VENTILATORS.

Fig. 15. Hinekes-Bird's window ventilator. Fig. 16. Seen from outside. A. Louvred pane.
B. Cooper's ventilator.

a certain amount, warmed by the radiated heat, rises, and, meeting with currents of cool air, is diffused throughout the room.

Warming.—As a general rule the temperature of a room should be about 60° F. to 65° F. It is a difficult matter in this climate to keep up a constant temperature, and at the same time to admit a free supply of air. The methods of warming a room in common use are (1) by open fireplaces, (2) by stoves and hot pipes. Open fireplaces are by far the most pleasant, but are extremely wasteful, more than half the heat given off by the fuel passing up the chimney. This is obviated to a certain extent by making the back of the grate of fireclay, and instead of being perpendicular, curved forward, so that it becomes heated, and gives off the heat into the room. A grate so constructed is called 'rifle-backed.' In addition to this the floor of the grate should be made of a slab of fireclay, and not made of iron bars, as is usually the case.

Gas fires are very convenient, but should not be used without a free means of exit for the fumes, and a free entry for air into the room. A shallow tin containing water, placed in front of the fireplace, prevents the unpleasant dryness of the air so noticeable in a room heated by gas.

Stoves burning coal, coke, and oil, and hot-air and water pipes, differ from open fires in that the air heated by them is not allowed to escape up a chimney, but circulates through the room ; they are consequently much less wasteful, but not nearly such a good means of ventilation. They all tend to make the air unpleasantly dry. There are some stoves, now constructed, for which it is claimed that no flue is necessary to carry off the products of combustion, but as a general rule no stove should be used without some means of conveying the fumes out of the room.

CHAPTER III

HYGIENE OF INFANCY AND CHILDHOOD

Feeding—Clothing—Rest and Exercise—Development of Children.

IF hygiene is worthy of attention for the well-being of adult life, it is doubly so during infancy and childhood. During the period of growth and development all the vital processes are more active, and instead of proceeding along beaten paths, are at first erratic and uncertain, and it takes but little to upset them, and to permanently derange the working of the machine. It is a matter of common observation that a child's strength 'runs up and down' very quickly; it takes but little to depress it, but when the cause of depression is removed strength returns very rapidly, provided that the process is not too severe, too continuous, nor too often repeated. Children are extremely sensitive to bad food, exposure to great heat or cold, fatigue, constraint, and bad air.

In the previous chapters the more important points with regard to cleanliness, ventilation, &c., have been already indicated, but some remarks must be added on the feeding, clothing, and exercise of children.

Feeding.—Every mother should, if possible, suckle her infant, and the importance of this, both for her sake and that of the child, cannot be too strongly urged. With regard to the mother, there is a subtle sympathy between the breasts and the internal organs, and during the act of suckling, the organs, altered and displaced during the period of pregnancy, contract and resume their former condition, a process much delayed and often imperfectly completed when this duty is neglected. Then as to the child, no form of artificial feeding can imitate the actually living food which passes from the blood of the mother into her child. The bottle-fed infant, no doubt, ultimately does

well in many cases, but few escape periods of misery due to indigestion, which are comparatively rare to the more favoured breast-fed infant. Many an adult's life and disposition are soured by constant indigestion dating from infancy, for which a neglectful mother is wholly to blame.

To nurse a child successfully the mother must lead a quiet life, sheltered as far as possible from great excitement, worry, and fatigue. Her diet must be simple but varied, and the fatty element especially increased. Milk should be taken freely, and a larger amount of butter and cream than usual. Some alcoholic drink may be taken at lunch and dinner if it is her habit under ordinary conditions, but to rely too much on 'nourishing stout' is apt to produce a fat mother and an ill-nourished infant. In the earlier weeks of nursing, fruits and green vegetables must be taken with great caution, as they often cause diarrhœa and griping in the infant. During the first three months the child should be fed with the utmost regularity every two hours during the day, being put to each breast alternately, and, though many monthly nurses will disagree with this statement, it should be awakened if asleep when the time comes to be fed. The reason for this is, that if a child goes too long without food it awakes ravenously hungry, and is put to a breast which has not been relieved at the proper time, with the result that the milk flows too fast, the child sucks greedily, distending its stomach too rapidly, and vomiting follows. It is not so important to awaken it during the night. After the third month a healthy child will go for three hours without being fed, but will then want both breasts. When a mother is not strong a feeding-bottle may be used as well, given instead of the breast at equidistant times. Partial nursing is better for the child than no nursing at all. However healthy and strong a woman may be she should begin to wean her child at the beginning of the eighth month, and complete it at the ninth month.

Artificial feeding.—When for definite reasons it is impossible for the mother to suckle her infant, the feeding-bottle must be resorted to. The old-fashioned 'boat-shaped' bottle is far preferable to the more modern form with a long india-rubber tube, which should not be permitted in any nursery. The grease of the milk acts on india-rubber, destroying its surface and quickly coating it with rancid slime. Whatever bottle is used the greatest

care must be taken to keep it clean. Any food left in the bottle must be immediately thrown away; the bottle should then be placed in warm water, in which a little soda has been dissolved, then repeatedly rinsed out with fresh water, and finally placed in an airy place to drain and dry. The rubber teat requires even more attention, and must frequently be renewed. The difference between human and cow's milk has already been mentioned, and if we wish to roughly imitate human milk, we must dilute the milk of the cow with twice the quantity of water, add sugar, and a little cream to make up for the deficiency in fats in its diluted condition, and add one-twelfth part of lime water to make it alkaline. Even then they differ, as in the process of digestion the curd of human milk is loose and flocculent; that of cow's milk forms cheese-like masses.

A newly-born infant gets about two ounces (four tablespoonfuls) of milk from each breast every two hours, and this is the quantity of diluted milk to give in the bottle at each feed. The quantity of milk must be gradually and cautiously increased, and the amount of added water diminished at the end of the first month until the proportion is half milk and half water, and from the third to the sixth month two parts milk to one of water, after which most children can take pure milk.

The following table is a rough guide, showing the quantity and strength of food, together with the times for feeding an infant, for the first six months of life :—

Age	Strength of food	Quantity	Time	Number of feeds in the 24 hours	Total quantity
1st to 4th week ...	Milk, 1. Water, 2	2 oz.	Every 2 hours	8	16 oz.
2nd month ...	Milk, $\frac{1}{2}$. Water, $\frac{1}{2}$	3-4 oz.	Every 2 hours	8	24-30 oz.
3rd and 4th months ...	Milk, 2. Water, 1	5 oz.	Every 2½ hours	7	35 oz.
5th month... ..	Milk, 2. Water, 1	6-7 oz.	Every 3 hours	6	40 oz.
6th month... ..	Pure milk.	7 oz.	Every 3 hours	6	42 oz.

Some children digest condensed milk more easily than cow's milk, but it is usually given far too strong. It should be at first much diluted, in the proportion of two teaspoonfuls to the half-pint of water, and gradually increased to the extent of one teaspoonful to the ounce (*i.e.* ten teaspoonfuls to the half-pint of water), which strength should not be exceeded.

Infants for the first three months of life cannot digest starch: biscuits, corn flour and other farinaceous foods pass

through their intestines undigested. The various patent foods all contain starches already prepared so that they can be digested, but they all possess one common fault, that they contain little or no fat. Now fat is one of the most important elements of food in child life, and when deprived of it the whole nutrition is perverted, the bones and muscles especially being affected. A child fed on a diet containing too much starch and deficient in fat becomes weak and flabby. Its body may be fat, but the muscles are so feeble that the limbs cannot support the weight of the trunk. It is interesting to watch these helpless children becoming strong and active, their bulk diminishing, and their muscles developing by giving them fat to consume in some form, usually cod-liver oil. Most children have a craving for fat, but will not always take it in the form offered to them; they usually dislike the fat of butcher's meat, but like butter, dripping, and bacon fat, and rarely object to cod-liver oil. There is no objection to any of these, but good milk is the best way of giving them fat.

Next to the importance of giving milk comes that of regularity in feeding. 'Nothing in between meals' is a golden rule in feeding children. Even milk should only be given at stated times, and a child hot and thirsty during play should be given water, and not take copious draughts of milk. When in the stomach the fluid parts of milk separate in the form of whey, and the solids clot into curds, so that a drink of milk is really solid food to a child.

A child from six to twelve months of age requires five meals in the twenty-four hours, 8 oz. being taken at each meal, total, two pints of good milk. The meals should be given at intervals of three hours during the day, and the child will probably awake once and take the fifth meal during the night. The milk may be thickened by adding a small quantity of one of the patent foods or some *well-boiled* wholemeal flour, tops and bottoms, or rusks. Dr. Ashby gives the following excellent diet for a child from twelve months to eighteen months of age:—

'First meal, 7.30 A.M.—Fine bread sops with milk, or oatmeal, or hominy porridge made with milk.

'Second meal, 11 A.M.—A drink of milk.

'Third meal, 1.30 P.M.—Bread crumbs and gravy or a lightly boiled egg and bread and butter. Sago or rice pudding.

‘ Fourth meal, 5.30 P.M.—Bread and milk.

‘ Fifth meal.—Milk to drink.’

After the eighteenth month small quantities of fish, poultry, and well-minced underdone mutton may be given at the mid-day meal. In the words of Dr. Cheadle, ‘ Children are naturally animal feeders in early years,’ and meat is commonly withheld from them far too long. Their food should be as varied as possible, and the occasional sweetmeat immediately after a meal gives much pleasure and rarely does harm.

Clothing.—It is a common practice to load a child’s body with clothes and leave the arms and legs almost naked. Children require but few garments if of proper material and rationally constructed, but it is essential to health that the arms and legs as well as the body should be covered.

A child has relatively far more skin surface than an adult, and to illustrate this let us compare two boxes, one 6 feet square, the other only 1 foot square; the first has 216 square feet of surface and contains 216 cubic feet of space, the other has 6 square feet of surface and only 1 cubic foot of space; *i.e.* the small box has relatively six times as much surface as the larger box, and in an irregular-shaped figure such as the human body the proportion is very greatly increased. By leaving the arms and legs bare a large surface is exposed from which heat is constantly being lost; consequently the child’s general nutrition suffers, much of his food, which would otherwise be utilised for the purpose of growth and energy, being expended in producing the wasted heat. Young children indoors play about on the floor and are exposed to the draught which runs under the door to the fireplace, and we would recommend the parent who makes his child wear socks instead of stockings in winter to try the experiment of having his own legs bare for a few hours, even in a well-warmed room.

Wool is the material for children’s clothes, and they should be loose and light, coming well up to the neck and down to the wrists, and as soon as the child can walk stockings should be substituted for socks. The clothing constantly becomes too tight from the child’s rapid growth, and the shrinking of the material when washed. On no account allow a child’s feet to be cramped; the feet grow rapidly during the first years of life,

and unless comfortably shod it cannot enjoy active games. The night-dress should be long, reaching below the feet, and made of flannel; the bedclothes are often too thick and heavy, and the child, overheated and restless, kicks them aside and then catches cold. Many children habitually uncover themselves at night, and it is a good plan to have tapes sewn on to the corners of the upper blankets, which can be tied to the side rails of the cot, on a level with the child's neck.

Rest and exercise.—Children require far more sleep than adults; the young growing brain is constantly receiving fresh impressions, and this activity when awake must be compensated for by frequent periods of relaxation. The midday sleep should be continued until the fourth or fifth year, and the duration must be judged by the natural inclination of the child.

A child should be kept out of doors as much as possible and allowed to play instead of being taken for monotonous walks. In summer children must be got out early, before the sun is very hot, and should be kept in the shade during the midday heat. In late autumn and winter the early mornings are often damp and cold, and it is better not to take children out before 10.30 A.M., bring them in for the midday sleep at 12, dinner at 1 P.M., take them out again as soon after 2 P.M. as possible, and return home not later than 4 P.M. in midwinter.

When the weather is doubtful, cold, and sunless, the question often arises: 'Shall the children go out?' The answer must depend on the age and condition of the children. Infants who must be taken out in perambulators, and children who are 'out of sorts,' refusing food or suffering from one of the minor ailments of childhood, are best kept in their nurseries on cold, damp, and windy days; but there are few days when a healthy child cannot be taken out for a run. It does no harm if his feet do get wet so long as he is warm when out, and has his stockings changed on coming home; but the outing should be a brief one, he should not be taken too far away, and if rain comes on he must be brought home through it and his clothes changed at once, and he should not be kept standing cold and miserable in hopes of its clearing up. The flimsy and elaborate garments so often provided for children, so much trouble to put on, and so easily spoilt by rain, are the chief

cause of nurses being unwilling to take children out in doubtful weather. In really bad weather the children should be dressed as though going out, the windows and doors of the nursery thrown open, the furniture pushed aside, and some romping game played. After an hour or so the children may be taken to another room, and their outdoor clothing removed, and return to their nursery when it has become warm again. It is only during dense foggy weather that this expedient for airing both children and nursery cannot be resorted to. During the dense fogs which sometimes occur for many days in succession in large towns the health of the children must necessarily suffer.

DEVELOPMENT OF CHILDREN

Much interest is naturally felt by parents in the progress of their children, and in infancy this must be judged by the gain in weight, length, and activity, and the development of the teeth. It is important to remember that increase of size and weight without a corresponding increase in activity means that the child is not doing well and the diet probably wants altering. Actual loss of weight is a certain sign that something is wrong. Most children lose some of their plumpness when they become more active in their movements, at the end of the second year, but this apparent thinness is not attended by loss of weight. An infant should be weighed at least once a month, and occasionally measured, to see if all is going well. At birth an infant averages about $7\frac{1}{2}$ lb. in weight—boys being usually rather heavier than girls—and measures 19 inches in length; at the end of the sixth month it should weigh about $16\frac{1}{4}$ lb. and measure 23 inches; and at the end of the first year the weight should be about $22\frac{1}{2}$ lb. and the length 27 inches. After the tenth or eleventh month the gain in weight should be continuous, but is usually not nearly so marked as it is in the earlier months.

A child can usually sit up at the eighth month, and begins to try to walk about the twelfth month, but if it can crawl it is usually rather late in attempting to walk. Talking usually begins at the end of the first year, but words are not strung together into sentences until the beginning of the second year.

The flow of saliva begins at the third month, and on the

child dribbling many mothers think that teething is beginning, but the first teeth are usually not seen until the sixth or eighth month. The first set or milk teeth are twenty in number, consisting of four front cutting teeth or incisors, two eye teeth or canines, four grinding teeth or molars in each jaw, and are usually cut in the following order :—

6th to 8th month.—Two central incisors of lower jaw.

8th to 10th month.—The four incisors of upper jaw, the central ones usually rather before the lateral incisors.

10th to 12th month.—The lateral incisors of lower jaw.

12th to 14th month.—The front molars, two in each jaw.

18th to 20th month.—The eye teeth, two in each jaw.

24th to 30th month.—The two back molars in each jaw.

The second set, so erroneously called ‘permanent teeth,’ are thirty-two in number, and begin to appear at the sixth year. The first to be cut are the front molars behind the temporary molars, and these new teeth are especially liable to decay. The rest follow, replacing the temporary teeth, and all are cut except the back molars (wisdom teeth) by the fourteenth year. The wisdom teeth are not cut until the seventeenth to twenty-fifth year, and are sometimes delayed until life is well advanced.

The mental development of children varies very much, and precocity in a child is not usually a sign of great brain power in the future. It is a striking fact throughout the animal kingdom that the more intelligent the animal, the longer the brain takes to develop. In man, the well-balanced mind is often possessed by one who is backward in childhood, but who ultimately does the best work in adult life. It may be thought that it is out of place to mention the training of children here, but the peevish misery of a spoilt child has a marked influence on the bodily health. ‘No’ should mean ‘no,’ to a child, and ‘yes’ mean ‘yes.’ Thoughtless people in charge of children often refuse an innocent request without reason, and then give way, and a child soon learns that the way to get a thing he wants is to scream for it. During the second and third years of life a healthy child tries to master his parents, and it depends on his treatment during these years whether he is to acquire the habit of peevish discontent or happy obedience.

CHAPTER IV

HEALTH IN THE TROPICS

Food and Clothing—Camping out.

EUROPEANS visiting tropical countries are liable to suffer in health from :—

(1) The enervating influence of prolonged exposure to heat. (2) diseases conveyed by impure water and tainted food ; (3) malarial fever ; and (4) sunstroke or heatstroke. Habits of indolence are easily acquired, which lower the vitality of the body and pave the way for disease, and the ordinary laws of hygiene should be borne in mind. Above all things it is essential to be temperate in eating and drinking, and to take regular exercise during the cool hours of the day. The free action of the skin must be maintained, and the body consequently requires a larger amount of fluid, but the quantity consumed is largely a matter of habit. If no restraint is exercised and fluid is taken in excessive amounts the digestion is disordered, sweating is aggravated, and an insatiable thirst induced. This is particularly the case if alcohol is taken too freely. It is generally agreed that the less alcohol taken the better, that none should be taken during exposure to the sun, and that it is best to reserve it until the evening meal after sunset ; during hard exercise thirst should be allayed with cold coffee or tea, to which some lemon-juice may be added. Persons who wish to keep their health in the tropics should rise early and go to bed early. They should rise at 5 or 6 A.M., and take a moderate breakfast with tea or coffee, and if they are in a malarious district, a few grains of quinine. Outdoor exercise should then be taken, and on returning to the house before the midday heat, cold bathing and friction of the skin with a towel should be practised. The lunch should be light, and the habit of taking a midday sleep is best avoided. The hot hours are best spent in reading

or writing. Another bath may be taken before the evening meal, which should be the most substantial meal in the day, and bed should be sought at 9 or 10 P.M.

Woollen clothing should be worn next the skin both day and night, which prevents the body getting chilled after perspiring freely, and a flannel band or 'cholera belt' should be worn round the abdomen. The outer clothing should be loose, but fairly thick to prevent the sun's rays striking through, and it should be porous so as to absorb and allow the free evaporation of moisture. The head covering must shade the eyes, the temples, the back of the head and neck. It should be perforated under the rim for ventilation, and its thickness should be increased by winding round a puggree, and the free ends allowed to hang down so as to shade the neck and the upper part of the back.

Every care must be taken against drinking, or allowing food-containing vessels to be washed with, polluted water. Fruit and uncooked vegetables, salads and the like, must always be regarded with suspicion, owing to the water which has been used during their cultivation. It must also be remembered that the vitality of microbes is only suspended and not destroyed by freezing, and that iced water, creams, and sweets generally, are not rendered innocuous by the process if they have been previously contaminated.

Malarial fever is dealt with elsewhere, and it is only necessary to remark here that it is particularly prevalent at the end of the rainy season when the sun begins to dry up the moisture. Persons who camp out when on shooting expeditions are often attacked.

Camping out.—The site for a camp must be selected according to the nature of the ground and the facility for obtaining water. The following sites should be avoided :—(1) marshy or mossy ground, clay soil ; (2) woods containing accumulations of decaying leaves ; (3) ground to leeward of a wood or marsh ; (4) the foot of a hill ; (5) ravines and watercourses, which are liable to become flooded if it rains heavily.

When possible grassy, sandy, or gravelly ground, or the side or top of a hill, should be selected. Drinking-water should be first filtered and then boiled, and the source must be protected from pollution. If it is drawn from a stream, the watering-place for animals must be below the spot where water is drawn for

drinking, and no bathing or washing must be permitted above it. A trench for the reception of refuse, known as a latrine, should be dug to leeward of the camp, in a position where it is impossible for fluids to percolate through the soil and contaminate the water supply. Some of the excavated earth should be thrown over the refuse daily, and when the camp is to be shifted the trench should be filled in before moving off. If a camp is to be occupied for some time the tent should be struck every two days, the ground cleared and swept and left exposed to the sun and wind for some hours. Clothing that has got wet from rain or perspiration should be changed as soon as the day's work is done, and at night a mackintosh sheet or some other protection against damp should be placed between the sleeper and the ground. Immediately on rising some coffee and a dose of quinine should be taken before starting the day's work.

PART III

GENERAL PRINCIPLES OF DISEASE

CHAPTER I

CAUSATION, PROCESSES OF, AND CONDITIONS PRODUCED BY DISEASE

Predisposing and Exciting Causes—Functional Disease—Organic Disease—
Inflammation—Fever—Cachexia—Collapse or Shock—Death.

IT is impossible to define the exact meaning of the word disease, owing to the difficulty of fixing the exact point where health ceases and disease begins. In all probability few persons, if any, are absolutely healthy in every function of the body, yet many go for years without a day's real illness or requiring a single dose of medicine. Let us then take disease to mean any departure from health which makes life uneasy, useless, or tends to shorten it.

CAUSATION OF DISEASE

In treating on the causation of disease, two terms are commonly used: **predisposing**, and **exciting causes**. The more important of the **predisposing causes** are:—

1. *Age*: infancy being especially liable to disturbances of the digestive system, puberty to the acute fevers, and old age to diseases caused by wear and tear of the body.

2. *Sex*.—Certain diseases are more common to men, others to women, quite independently of the special organs.

3. *Heredity and personal peculiarities*.

4. *Occupation and habits of life*.—Clerks who lead a sedentary life, soldiers and sailors who have to undergo periods of severe exertion, and workmen who breathe air charged with dust, are all liable to special forms of disease.

5. *The effects of previous disease*.—Some diseases are protective against future attacks of the same disease, such as mumps; others predispose the person to a fresh attack, such as

erysipelas; or pave the way for another disease, such as scarlet-fever, which is so often followed by acute rheumatism.

6. *The influence of climate and impure air.*—Heat and cold, dryness and moisture, all indirectly predispose to disease.

7. *Neglect of the laws of hygiene*, and consequent lowering of vital resistance.

The **exciting causes** of disease are:—

1. *Mechanical*, which may be subdivided into causes which arise outside the body, and those which arise inside. The first include all forms of external violence, and are mainly surgical diseases; the second include obstructions to the ducts of glands, to the intestinal canal, pressure on nerves, and other organs.

2. *Chemical*: poisons derived from the vegetable and mineral kingdoms, the venom of animals such as snakes, or decomposing food; poisons which are manufactured and retained in the body as the result of disease of the organs of excretion, such as the kidneys and skin.

3. *Thermal*: exposure to great heat or cold or sudden chills.

4. *Parasites*; animals, such as worms which frequent the intestine, and insects which dwell in the clothes, the hair, and the skin; vegetable parasites, or microbes, which have already been described at some length.

5. *Vital causes*, such as the failure of the brain, heart, or organs of digestion to carry on their functions, or the occurrence of malignant growths, such as cancer, the origin of which is at present obscure.

THE PROCESSES OF DISEASE

When some disturbance occurs in the current of health, having first endeavoured to ascertain the cause, we next try to realise what changes are actually occurring in the tissues. In some diseases we are unable to detect the smallest change by any known method of examination during life, nor even with the microscope after death, and such conditions are spoken of as ‘functional disease,’ and are probably dependent on some alteration or failure of the nervous system the nature of which in the present state of our knowledge is quite obscure. We may know the cause and see the effects, but cannot realise the

actual changes in the tissues. Many of these conditions which are not at present understood are called 'hysterical,' others follow grief, fright, or the shock of some accident unattended by any perceptible injury.

When there are changes which can be detected, the condition is termed 'organic disease,' and the tissues are altered in one or more of the following ways:—

1. Enlarged or 'hypertrophied.'
2. Wasted or 'atrophied.'
3. Altered in structure—degenerated.
4. Inflamed.
5. Perished, either in part or completely.
6. Congested, or deficient in blood.
7. The seat of accumulated fluid—dropsied.
8. The seat of some tumour or 'new growth.'

1. *Enlargement or hypertrophy* is most often due to increased blood supply, which may be caused by excessive use, or long-continued irritation.

2. *Wasting or atrophy* is due to a poor supply of blood, either quantity or quality, or to deficient use. This condition occurs during long illnesses, and in ill-nourished and bedridden persons.

3. *Alteration in structure, or degeneration*, is part of the above conditions: long-continued congestion causes the tissues to become fibrous and hard; a deficient supply of blood causes fatty degeneration. The tissues of old people undergo fatty degeneration, which is followed by a deposit of lime salts, and the condition is then called 'calcareous degeneration.'

4. *Inflammation*.—The changes which constitute inflammation occur in the tissues to a greater or less degree after any form of injury or irritation, whether mechanical, chemical, thermal, or from the influence of microbes. The degree is determined (1) by the severity of the irritation, and (2) the vital resistance of the person. Thus a young vigorous man may play a game of football exposed to cold and wet, and receive severe blows without any after-effect, whilst an old man, whose vitality is low, may receive a trivial injury which is followed by severe inflammation.

The signs of inflammation in a tissue are: (1) redness; (2) swelling; (3) heat; and (4) pain. The redness and swell-

ing are due to the capillaries being dilated and the tissues containing more fluid than in health; the heat is due to the capillaries of the skin being dilated and the blood being supplied in larger quantities to the surface of the part; the pain, to the ends of the nerves being pinched by the swollen tissues.

These four cardinal signs vary in intensity according to circumstances. If an organ is situated deep to the surface, the redness and swelling cannot be detected. In rigid tissues, such as bone, the swelling is very slight, but the pain severe; loose tissues, such as the skin of the eyelid, swell very rapidly, and with but little pain until the skin is stretched, and the nerve endings pinched, and then pain sets in. Inflammation of the mucous membranes is usually accompanied by an increased secretion of mucus, and the condition is called 'catarrh' or 'catarrhal inflammation.' In some cases there is no increase or even decrease of the normal secretion; this is called 'dry catarrh.' The whole process has been observed with the aid of a microscope during life in transparent tissues, such as the web of a frog's foot. After receipt of an injury the capillaries of the part are seen to become distended with blood, and there is a considerable increase in the number of white corpuscles; these corpuscles, together with a large quantity of blood serum, pass through the walls of the capillaries into the surrounding tissue, causing it to become swollen and sodden.

When this condition has arisen it may terminate in several ways :—

(1) If the damage is slight and the tissues are healthy it may pass off, the capillaries resuming their usual size and the fluid and corpuscles being drained off by the lymphatic vessels and veins.

(2) If the damage or irritation is slight, but continued, or the tissues are in an unhealthy condition, the capillaries may continue to be enlarged for an indefinite time, and the condition is called 'chronic inflammation.'

(3) When the damage is too severe or too continuous for the vital resistance of the tissues to withstand, the blood in the capillaries may come to a standstill, and the surrounding tissue become choked with fluid and exuded corpuscles. The tissue then softens, and the white corpuscles degenerate and form what are called 'pus corpuscles,' and an abscess, containing 'matter,' *i.e.*

'pus,' is thus formed. This condition, popularly called 'gathering' or 'festering,' is termed 'suppuration.' The pus in an abscess occasionally becomes absorbed, but usually, unless released by an opening made by a surgeon, burrows through the tissues by the easiest path until it reaches the surface of the body, and perforating the skin is discharged.

5. *Death of tissue*.—When the vitality of a tissue is extremely low or severe damage is sustained, the capillaries may become choked very rapidly, and the tissue perish piecemeal or in large areas.

When it perishes in minute particles the process is called 'ulceration'; when the tissue perishes in large masses it is called 'necrosis,' 'sloughing,' or 'gangrene.' The two processes are identical, being only a question of degree.

6. *Congestion* is a term loosely applied to a variety of conditions, including inflammation. It should be used to mean increase of blood in a part due to a mechanical cause, either from some obstruction to the return of the blood or from failure of the heart to drive the blood on. Thus a tight garter causes congestion of the foot and leg; both arteries and veins are compressed, so that the blood stream to the tissues is diminished in force and its return through the veins impeded. The lower part of the lungs of old people, especially when bedridden, is commonly more or less congested owing to the feeble heart.

The converse condition, bloodlessness or 'anæmia,' may be due either to (1) diminution in the quantity or (2) alteration in the quality of the blood, the latter being the more common. Both may exist after great loss of blood, or as the result of privation.

7. *Accumulation of fluid—dropsy*.—Dropsy may be due to (1) obstruction to the flow of blood in the veins, (2) to alteration in the constituents of the blood, (3) or to disease of the lymphatics, causing the liquid of the blood to collect either in the substance of the tissues or in the cavities of the body. Dropsy may be either local or general.

(1) General dropsy is commonly due to disease of the heart, lungs, or kidneys. In disease of the heart and lungs the circulation is impeded, and fluid tends to collect in the tissues. In kidney disease the waste products of the body which should be excreted are retained in the blood, consequently the tissues

are supplied with impure blood, their nutrition suffers, and fluid accumulates in their substance.

(2) Local dropsy is due to some mechanical obstruction to the veins or lymphatics of, or to some inflammatory condition in, the affected part.

In certain diseases of the liver the veins from the stomach and intestines are obstructed, and dropsy of the abdomen results. When the pleura is inflamed, fluid may be secreted to such an amount that the pleural cavity is distended, causing compression of the lung and displacement of the heart.

8. *Tumours or 'new growths.'*—The word tumour literally means a swelling, but it should more correctly be reserved to indicate a newly formed mass of tissue which is useless, and tends to persist and grow. Their origin is very obscure, and cannot be discussed here, but they often follow injury in young people and long-continued irritation of the tissues in the old. They are divided into two great classes—innocent and malignant tumours.

(1) Innocent tumours in structure closely resemble the tissues from which they grow, and are fibrous, fatty, or bony. They usually grow slowly, and when removed rarely return. They may give trouble from their size and weight or by pressing on surrounding structures, but do not impair the health in other ways.

(2) Malignant tumours, such as cancers and sarcomas, grow into the surrounding tissues, and by means of the lymphatics or blood-vessels tend to set up other growths like themselves in distant parts of the body. When removed they may return in the same place or appear in other parts. They irritate the organs in which they grow, cause them to become inflamed, and interfere with their functions. They may ulcerate and bleed, and cause great pain, and so shorten life. These tumours, formerly so fatal, are now robbed of their terrors to a great extent. If recognised and submitted to surgical treatment early, they can frequently be removed almost painlessly, never to return.

CONDITIONS PRODUCED BY DISEASE

1. **Fever**, by which we mean a rise of the temperature of the body above the normal point (98·4° F.), is commonly present

whenever inflammation is occurring from any cause. The actual cause of the rise of temperature is a disputed point, but is probably due to the products of the inflamed tissues circulating in the blood and affecting the nerve centres which regulate the heat of the body. The signs of fever vary according to the cause, the general health of the person, and the intensity and duration of the inflammation, and they have been grouped together, so that three forms of fever may be recognised—*sthenic* (or strong), *hectic* (or habitual), and *asthenic* (or weak), though they often merge imperceptibly into one another.

(1) *Sthenic fever* is met with in young and middle-aged persons of vigorous constitution, and occurs at the onset of infectious fevers, during the formation of an abscess, or in inflammation of any large organ such as the lungs.

Four stages of fever may be recognised, and are useful for the purpose of description, but in practice one stage may be so slight and another so marked, or they may merge so rapidly and imperceptibly into one another, that they cannot be distinguished.

(i) The premonitory, or forming stage, is usually marked by a feeling of weariness, depression of spirits, and discomfort sometimes amounting to aching pain in the back and legs.

(ii) The stage of invasion, or onset, is marked by chilliness, shivering alternating with hot flushes. Sometimes in this 'cold stage' a violent shivering fit or 'rigor' occurs, the chattering of the teeth and shaking of the limbs being attended with intense headache and prostration, and is often followed by vomiting. In very young children rigors are almost unknown, vomiting commonly, and convulsions occasionally, marking the onset of fever. During a rigor, though the surface of the body feels cold, the temperature of the internal organs is very considerably raised.

(iii) The stage of development, or hot stage. The pulse, which has previously been rapid but small, owing to the contraction of the arteries, now becomes full and bounding, and the face becomes flushed and red. The skin feels hot and dry, and if the temperature is taken it is found to be considerably raised. If it does not exceed 101° the fever may be considered 'slight'; from 101° to 103° it is 'moderate'; from 103° to 105° it is 'high'; there is considerable danger when it passes 105° , and death is

almost certain if it reaches 107° . The rapidity of the pulse usually bears some relation to the temperature, except in excitable and nervous persons, when the rapidity of the pulse is out of proportion to the temperature. The respirations are rapid, the tongue becomes furred, there is thirst and absence of appetite, the bowels are usually constipated and the urine scanty and high coloured.

(iv) When the hot stage has existed for a longer or shorter time, fever may terminate in one of the following ways:—

(a) It may disappear suddenly by a ‘crisis,’ a profuse perspiration, diarrhoea, or copious flow of urine taking place, leaving the patient weak and depressed but convalescent.

(b) It may disappear gradually by ‘lysis,’ there being no marked point where the fever leaves and convalescence begins.

(c) It may continue for an indefinite time, varying from day to day, merging into one of the other forms of fever, or end in death.

(2) *Hectic or habitual fever* may supervene on any acute fever, but commonly accompanies diseases such as consumption or disease of bone. At first the symptoms are similar to those of sthenic fever, but are much milder, and come on insidiously. The patient first notices that he is losing strength, that he feels chilly in the mornings, flushes after meals, and perspires at night. The temperature may be normal or only slightly raised in the morning, but rises to 100° or 102° towards evening. The tongue often continues to be clean and the appetite good for a long time, but as the disease progresses the appetite becomes capricious or fails, there is more or less thirst, the body emaciates, the weakness becomes extreme, and the character of the fever assumes the ‘asthenic’ type.

(3) *Asthenic fever* may follow the above conditions, or be seen from the first in people whose resistance is impaired by dissipation, privation, or advanced age. It may also occur in otherwise healthy people when attacked by virulent forms of such diseases as diphtheria or erysipelas. The signs of weakness are very marked; the pulse is rapid and small, often irregular; the temperature may not be high, but is usually above normal in the mornings and rises considerably towards night; the skin feels hot and dry at one time, cold and clammy at another. The tongue becomes brown and dry, the lips parched and

cracked, and the gums and teeth coated with dry mucus. The patient looks dull and stupid when awake, and when asleep lies with the eyes half open, talking in a muttering way. There is often difficulty in swallowing, and constipation or offensive diarrhoea may be present. There is sometimes wild delirium and restlessness from the first, and in these cases death usually occurs early.

2. **Cachexia.**—Cachexia means a state of chronic ill-health, and arises from (1) mal-nutrition, (2) wasting of the constituents of the blood, or (3) the presence of poisons or disease-producing substances in the blood. The poor herded together in ill-ventilated rooms, persons suffering from diseases attended by loss of blood or prolonged suppuration, painters who absorb lead, and those affected with kidney diseases, are examples of the cachectic condition. The complexion is sallow, the tongue furred, the digestion and evacuations are disordered, and muscular energy feeble. Cachectic people suffer much from cold, trivial wounds fester and refuse to heal, and they readily contract and succumb to diseases of all kinds.

3. **Collapse or shock, fainting, syncope.**—Collapse is a condition in many ways the opposite to that of fever, and is usually attended with low temperature. It may be present at the onset of fever during the ‘rigor,’ or follow the ‘crisis,’ as in pneumonia. It may be caused by (1) injuries of all kinds, especially of the head and abdomen; (2) loss of blood; (3) pain; (4) bleeding, or profuse discharge from the stomach or bowels; (5) distension, rupture, or perforation of the internal organs; (6) fright or grief. During collapse the face appears pale and pinched, the surface of the body feels cold and clammy or drenched with perspiration. The pulse is often felt with difficulty; it is usually rapid, sometimes slow, and often irregular. The breathing is shallow, irregular, and infrequent, sometimes sighing or gasping. There may be vomiting and hiccough. The patient may lie unconscious and motionless, or be restless, throwing the limbs about and complaining of breathlessness, noises in the ears, and failure of sight.

Fainting or syncope is only a variety of shock, the symptoms coming on and passing off more rapidly, and are more intense

while they last. Recovery from shock or syncope is followed by more or less marked symptoms of reaction. The colour returns to the face, the pulse improves, and the temperature rises, often above the normal point, and the symptoms of fever may follow.

4. **Death.**—The signs which usher in death vary according to the nature of the disease and the organs affected, but they may be grouped into four main divisions.

(1) Death from failure of the circulation. This may be due to disease of the blood-vessels, but more often to failure of the heart. It may come on rapidly, the patient fainting and dying immediately; or it may be less sudden, the condition described as collapse occurring, from which he does not rally; and lastly, it may be gradual and last for some days, the blood stagnating in the extremities and dropsy or gangrene may occur with gradually increasing symptoms of collapse.

(2) Death from failure of the organs of excretion; lungs, or kidneys. Failure of respiration (asphyxia) may be sudden, as in choking, the patient becoming blue, with gasping futile attempts to breathe, then giddy and gradually unconscious. It may be gradual, as in chronic bronchitis, and then resembles progressive failure of the heart; there is much anxiety, distressed breathing, distension of veins, and finally drowsiness passing into complete unconsciousness. The retention of waste products in the blood from disease of the kidneys causes general mal-nutrition and dropsy of the tissues. There is usually marked affection of the nervous system, restlessness, delirium and convulsions occurring towards the end.

(3) Death from failure of the nervous system may occur as the termination of diseases of other organs besides the brain. It must be remembered that the sympathetic system of nerves which control all the vital processes of the body may fail as well as the brain and spinal nerves. Unconsciousness (coma) may occur first, and the breathing become slow and irregular, gradually the heart and blood-vessels are affected, the secretions of the throat and air-passages accumulate, and the patient dies of asphyxia.

(4) Death from failure of nutrition may arise from starvation; from persistent vomiting, diarrhoea, and failure of the intestinal

canal to absorb nutriment; from long-continued fever, and wasting diseases. Towards the end there is commonly lowering of temperature, emaciation and profound weakness, gradual failure of the mental and nervous functions, and lastly cessation of the heart's beat.

The signs of death.—It may be the lot of anybody to have to decide the important question as to whether death has actually occurred or animation is only suspended. When a man is stunned, partially drowned, or collapsed in diseases such as cholera, he may appear to be dead but revive after a considerable period if proper means are taken to restore him. The following signs of death, having actually occurred, are stated in the order most likely to be followed:—

1. Cessation of the heart's beat. To judge of this the ear should be applied for some minutes to the chest, bared of clothing, at a point between the left nipple and the breast-bone, whilst perfect silence is maintained in the room.

2. Cessation of the circulation. A string or tape should be tied round a finger or toe. If there is any circulation, however feeble, after a few minutes there will be a change in the colour of the skin beyond the ligature.

3. Cessation of respiration. Place a flock of cotton wool, fluff from a blanket, or down from a feather on the lips, and watch if it is moved by the draught of the breath.

4. Changes in the eyes. The eyeballs become fixed, the pupils do not alter in size on alternately shading them and exposing them to a strong light, and on touching the eyeball there is no blinking of the lids.

5. Rigidity of the limbs (*rigor mortis*) sets in at variable periods. After wasting illnesses it is delayed, though never longer than twenty-four hours, and it occurs early if there is much muscular power at the time of death.

6. Putrefaction usually begins on the third day, a greenish discolouration of the abdomen being first noticed. The rapidity of onset depends on the condition of the body at the time of death and the temperature and moisture of the surrounding air.

CHAPTER II

METHODS OF OBSERVING AND INVESTIGATING DISEASE

Diagnosis—Pain and Morbid Feelings—The Pulse—The Breathing—The Tongue—The Throat—The Skin—The Digestive System—The Bowels—The Urine—The Temperature.

WHEN a person is ill or has received an injury an attempt must be made to distinguish what the actual condition is. Doctors term this making a diagnosis, or diagnosing a disease. This is done by listening to the description of pain or discomfort felt by the patient (the subjective symptoms), and then searching for any alteration in pulse, temperature, or general appearance (the objective symptoms). Having noted the symptoms, some disease or condition may be suggested, and possibly a correct diagnosis may be made at once. In some cases it is extremely difficult, and it is often impossible at the commencement of an illness. Thus a child may have a severe cold in the head and some fever, but it is impossible to say whether the condition is measles or not until the rash has appeared. There may be other circumstances which may help you, such as the child having been in contact with another who had recently suffered from the same disease, which renders it probable that the condition is due to measles, but in no case should treatment be adopted without a careful attempt to make a diagnosis. When it is impossible to make an accurate diagnosis, all forms of active treatment, such as purging, must be avoided. Skilled advice should be sought, and meanwhile the patient should be kept at rest, fed with great care, and his discomforts relieved by simple remedies.

Pain and morbid feelings.—The primary point of attention is the patient's own account of his feelings, the seat of his pain, its character, his history of the attack, its duration, and the causes to which he attributes it. In adults, this frequently at once shows us the nature of the disease, and directs our

attention to the organ affected. Many, however, are prone to exaggerate—to describe as agony what a slight observation will convince us is a very moderate degree of pain. We watch the countenance; its expression informs us more correctly the degree of suffering present. As a general rule, the more ill the patient is, the less he is inclined to describe his sufferings. Children are usually singularly reticent about their feelings, and require very careful observation. In them, refusing food or vomiting, listlessness, neglect of their toys, and tearless fits of crying, are the signs of illness. Like the lower animals, when ill they are inclined to separate themselves from their fellows, and mope in quiet and dark retreats.

Pain varies in its character; when continuous, dull, and aching, it is often due to rheumatism. Shooting or stabbing pain is due to some affection of the nerves (neuralgia), and the actual seat of the disease may be far removed from the seat of the pain. Throbbing pain usually indicates the occurrence of inflammation, and is especially marked when suppuration is taking place in rigid tissues. In disease of bone the pain is usually much worse at night than during the day.

The pulse.—We feel the pulse by placing two fingers on the artery at the wrist, this being the most convenient locality for the purpose. The object is to note the strength or weakness of the heart and circulation, and we judge this by the frequency, regularity, force, and size of the pulse. The frequency is judged by counting the number of beats to a minute; the regularity, by the rhythm in a given number of beats; the force, by gradually compressing the artery with the first finger until the pulse ceases to be felt by the second finger lying on the artery at a lower point; the size, by the prominence of the artery and by rolling the two fingers across it transversely. In health the beats number from sixty to eighty per minute. They are more frequent in the young than in the old; in females than in males; in the morning than at night; when standing than when sitting; when awake than asleep; and after a meal than before.

When considerable pressure is needed to compress the pulse, and so cause cessation of the beat below, the term ‘hard’ is used; when easily compressed it is called ‘soft.’ In

fever the frequency of the pulse is increased, and, though liable to many exceptions, the increase usually bears some relation to the temperature present. Thus a pulse of from 80 to 90 accompanies a temperature of 100° to 101° ; a pulse of from 90 to 110 accompanies a temperature of 101° to 103° ; a pulse of from 120 to 130 accompanies a temperature of 103° to 105° . With very high temperatures the pulse may rise to 180° . Any number above this is extremely difficult to count.

A *slow* pulse may occur in jaundice, kidney diseases, in convalescence after pneumonia, and in diseases of the nervous system.

Irregular pulse in diseases of the heart, dyspepsia, and excessive tobacco smoking.

Rapid, hard, and large pulse in sthenic fever and alcoholic intoxication.

Rapid, hard, and small pulse in inflammatory conditions of the abdomen.

Rapid, soft, and large pulse in rheumatic fever.

Rapid, soft, and small, a 'running' pulse, in extreme weakness, and if irregular as well, a grave sign of approaching death.

The breathing.—In health and when the body is at rest we usually take from sixteen to eighteen inspirations per minute, the chest expanding and the abdomen bulging forwards somewhat as each breath is drawn in. In the female the movement of the chest is more, and that of the abdomen less, marked than in the male. Breathing is quickened in many diseases; there may also be inability to take a deep breath, *i.e.* 'short breathing.' This may be present without the patient being aware of it, or it may cause great distress from pain or the sense of breathlessness. The movements of the chest should be carefully noted; in disease of the lungs there is always impairment of movement, and if the disease is limited to one lung the difference in the movement of the healthy side compared with the side affected is very striking. When some inflammatory condition of the abdomen exists, the movements are limited to the upper part of the chest, the lower ribs and the abdomen remaining motionless.

Various abnormal sounds in breathing may be heard, some

quite obvious, such as wheezing, rattling, or stertorous breathing; others can only be heard by applying the ear to the chest, or by means of a stethoscope. It would be futile to enumerate or endeavour to describe and explain these sounds, as only skilled training and long experience can enable us to interpret them correctly.

The tongue.—This is almost invariably examined, and the following points noticed:—(1) Its size and shape; (2) its condition as to firmness—when flabby the edges bear the impressions of the teeth; (3) its colour and surface, whether unnaturally red and glazed, or cracked and furrowed; (4) whether moist or dry; (5) the presence and colour of fur; (6) its movements, whether protruded, straight, or to one side, and if steady or tremulous. The tongue is examined, not only to gain some knowledge of the condition of the digestive system, but, being a muscular organ, it also indicates the condition of the nervous and muscular systems.

The following are the principal peculiarities it presents in disease:—

1. A tongue protruded to one side, and tremulousness, indicate some affection of the nervous system.

2. A furred and tremulous tongue commonly accompanies intemperate habits.

3. A furred tongue may not indicate any disease. It is often so in healthy persons, particularly on rising in the morning. In the febrile state it always becomes more or less furred. A thick ‘creamy’ fur accompanies rheumatic fever, tonsillitis, and influenza. A white furred tongue, with the papillæ showing as bright red dots, accompanies scarlet-fever.

4. A dry, bright red, and raw-looking tongue accompanies acute inflammation of the stomach, and when it follows a furred tongue, indicates a lingering convalescence.

5. A large, flabby tongue accompanies chronic indigestion.

6. A red, glazed tongue accompanies diabetes, dysentery, and is often present in typhoid fever.

7. A dark brown, dry tongue indicates great weakness, and is a grave symptom. Dryness only is often merely the result of breathing through the mouth, especially when asleep.

The throat should always be inspected as a matter of routine whenever febrile symptoms are present. This is a matter of difficulty, but of the utmost importance in children. The child must be seated upright, facing a good light. When an artificial light is used, it should be placed by the side and slightly behind the head of the person making the examination, so that the light does not fall in his eyes and dazzle him. The child should be coaxed into throwing the head back, opening the mouth widely, and induced to utter the sounds 'Ah! Ah! Ah!' loudly. If the child can be got to do this, a good view of the throat can be obtained without the forcible aid of a spoon, which often causes much struggling and distress. When the child is very young, it must be seated on the lap of an assistant, who holds its head with one hand placed across the forehead against her own chest, whilst she grasps the two hands in her other hand, and holds the legs between her knees. The handle of a spoon is then passed rapidly to the back of the tongue, and gentle downward pressure made.

The size of the tonsils, the colour of the palate, and the presence or absence of mottling, white spots or patches should be noted. The outside of the neck, particularly just below and behind the angle of the jaw, should then be carefully examined for any enlarged glands. Many eruptions can be seen on the mucous membrane of the palate before they appear on the skin; this is often the case in measles and chicken-pox.

The skin.—The state of the skin, as to its dryness or moisture, is looked to in searching for disease. A soft, moist skin without a redundancy of perspiration is the state of health. Dryness or sweating denotes disorder, unless the latter arises from exercise, bathing, or some medicine taken to promote it. Dry skin is commonly a sign of fever, or inflammation. Profuse perspiration attends consumption, rheumatic fever, internal abscesses, and fatal collapse from many diseases.

When eruptions are present it should be carefully noted on what parts of the body they first appeared, and if other symptoms of illness are present, how long they were noticed before the eruption showed itself.

The digestive system.—In disease the desire for food may be lessened or increased, or the appetite may be perverted,

curious articles, such as uncooked rice, chalk, and even cinders, being sometimes swallowed. The quantity of fluid drunk varies greatly in health, being influenced by temperature, occupation, and habit, but increased thirst is a common indication of fever, inflammation of the stomach, and diabetes.

When there is abdominal pain or discomfort it should be carefully noted whether the pain is continuous or intermittent, and whether it is relieved or aggravated by taking food. Some forms of pain in the abdomen are relieved by pressure, others intensified by it. If tenderness is present the tender spot should be localised, and this is best done by placing the patient on his back with the thighs bent. The hand of the person making the examination is then laid flat on the abdomen, and gentle but gradually increasing pressure made (care being taken not to dig the points of the fingers into the skin), and immediately abandoned directly it causes pain.

Vomiting is an important and common symptom of many diseases, particularly in children. Note the time of its occurrence, its relation to the taking of food, and whether it is followed by or relieves pain. The vomited matter should also be examined for large masses of food or curdled milk, bile, bright blood, or partially digested blood which looks black or dark brown like coffee-grounds.

The bowels.—The frequency with which the bowels act as well as the character of the stools should be observed. In health there is usually one action a day, and the stools are of a soft solid consistence and dark brown gingerbread in colour. The habit of two actions at regular times every day, or of only one on alternate days, is quite consistent with health. When the liver fails to secrete bile, or when the ducts are obstructed, and the bile does not enter the intestine to mix with the food, the stools become paler in every shade from a light yellow to absolutely white. The liver and intestine may secrete an inordinate amount of fluid, and diarrhoea result. Undigested food, mucus, and blood may be detected in the stools. Bright blood is usually from disease of the lower part of the intestine, most frequently from internal piles. Blood coming from the stomach or upper intestine is changed to a dark brown or black colour. Some medicines, such as iron and bismuth, make the stools

black in colour. When the action of the bowels is accompanied by pain, it should be noted whether it is simultaneous with the passage of the stool or follows it. Piles usually give pain during the act, ulcers or fissures of the external orifice (the anus) cause a burning or smarting pain lasting for some time after.

The urine.—In health the quantity of urine secreted in the twenty-four hours averages about two and a half pints, but varies very much according to the amount of fluid drunk, the dryness and heat of the atmosphere, the activity of the skin, and the amount of exercise taken. The colour also varies, being almost colourless when much urine is secreted, and a dark straw colour when the urine is scanty. In disease we have to note the frequency of the desire to pass water, the quantity passed, the colour, and any pain or difficulty attending the act. We also observe by the means of litmus paper whether the urine is acid or alkaline. *Acids* turn blue litmus paper *red*; and *alkalis* turn red litmus paper *blue*. In health the urine is usually acid, except that secreted whilst digestion is going on, when it is neutral (*i.e.* neither acid nor alkaline), or it may be faintly alkaline.

It requires some skilled training to test urine with accuracy, and it is better to leave this to a physician rather than to arouse vain fears or false security by inaccurate observations. When a specimen is wanted for examination, the urine first passed in the morning is to be preferred. The first part of the stream should be allowed to flow into the chamber-utensil and not be used; the remainder should be passed, if possible, directly into a perfectly clean bottle, which should be immediately tightly corked, and a label, bearing the name of the patient and date, attached.

The urine should always be carefully examined: (1) in cases of scarlet fever and diphtheria, both during the progress of the disease and during convalescence; (2) when the quantity passed is scanty, particularly when the eyelids and feet are noticed to be swollen; (3) when the desire to pass water is frequent or the quantity passed is very large, and the condition accompanied by thirst; (4) during pregnancy; (5) when the patient is to undergo a surgical operation; (6) when the urine smells offensively.

The following are the more common conditions of the urine which may attract attention or call for treatment :—

1. *Urates* or *lithates* exist in concentrated urine after profuse perspiration, and during inflammatory, rheumatic, and gouty conditions; they consist of uric acid combined with potash, ammonia, and soda. The urine containing them is acid, and when first passed is high coloured, but clear and transparent; on cooling it becomes thick, and deposits the urates as a sediment of various tints from light yellow, or pink, to a reddish brown. If this urine is heated or some warm water added, the sediment dissolves.

2. *Uric acid crystals* are met with in similar conditions, and resemble grains of cayenne pepper much more difficult to dissolve than the urates.

The popular name for urates and uric acid is ‘gravel.’

3. *Phosphates* are deposited as a sediment of a whitish colour, or may form a film on the surface of urine which is either faintly acid or alkaline. They do not disappear on heating, but dissolve when nitric or acetic acid is added to the urine. They often exist without any other sign of ill-health being present, but they may accompany dyspepsia and nervous debility, and are always found in decomposing urine.

4. *Pus and mucus* may be present in inflammatory conditions of the urinary passages, forming a white deposit in the urine; if the urine above is poured off and some caustic potash added to the deposit it becomes a more transparent, but a thick gelatinous fluid.

5. *Albumen* is found in the urine in many conditions, sometimes during high fever from any cause, but it almost constantly accompanies and is the direct result of disease of the kidneys. Albumen may be present in urine which looks clear and healthy in every respect, and being a constituent of blood and pus, is therefore present when they are.

When the presence of albumen is suspected a little urine should be thoroughly boiled and a drop of acetic acid then added; the formation or persistence of a white cloud after addition of the acid shows that albumen is present.

6. *Blood* may be present in the urine owing to severe injury, inflammation, or irritation of the urinary organs. In acute inflammation of the kidney, as in scarlet-fever, the urine is

scanty and looks brown or 'smoky' from the presence of altered blood. The urine may look light red, or almost pure blood be passed, when the bladder is affected or the kidney ruptured. There are many methods of detecting blood in the urine, the chief of these being the colour, the presence of albumen, and examination with a microscope.

7. *Sugar* may be present, and is a grave sign when accompanied by thirst and profuse secretion of urine. It may also be present in certain gouty conditions, unaccompanied by thirst, and disappearing by careful attention to diet. The most simple method of detecting sugar is to boil equal quantities of urine and caustic potash together; the solution becomes the colour of brown sherry if sugar be present.

8. *Bile* is present in the urine during jaundice, and makes it deep orange in colour, somewhat resembling urates, but unchanged by boiling.

9. *Crystals, shreds of the mucous membrane of the urinary passages, and microbes* may be present, but cannot usually be detected without the aid of the microscope.

The temperature of the body in health averages 98.4° Fahrenheit. It fluctuates about 2° F. in the course of the twenty-four hours, being lowest between 2 A.M. and 6 A.M., and gradually rises until it reaches the highest point between 5 P.M. and 8 P.M. In children the daily fluctuation is greater, and their temperature is easily influenced by external changes. In disease the temperature has been observed to be as low as 94° F., and as high as 110° F., and these are probably the extreme limits met with during life. Formerly the temperature of the body was roughly estimated by the sensation of heat imparted to the hand, and by the rapidity of the pulse and respiration; but this method is likely to mislead even the most experienced of observers, and has given place almost universally to the use of the thermometer. The clinical (bed) thermometers now used in this country are graduated with Fahrenheit's scale marked in degrees from 95° to 110° or 112° , and the degrees subdivided into fifths, *i.e.*, two decimal points, the normal point being indicated by an arrow-head. The mercury of the clinical thermometer in the illustration (fig. 17) stands at 100° and two-fifths, or, as it is usually expressed in decimals, 'a hundred,

point four.' They are so constructed that after being warmed the mercury remains at the point to which it has risen until shaken down into the bulb by a sharp jerk. Inexperienced people often find much difficulty in shaking the mercury down after the thermometer has been used. To do this, hold the thermometer firmly between the finger and thumb at the extreme end away from the bulb, raise the hand to a level with the head, and then bring it down with a sharp jerking motion till the arm is extended by the side of the body. If this movement is repeated three or four times it will rarely fail to shake the mercury sufficiently down, *i.e.*, to 95° . The temperature is usually taken in the mouth, the thermometer being placed under the tongue and the patient told to close the lips and breathe through the nose; or in the armpit, the arm being kept close to the side. In fat children it may be taken in the fold of the groin, the thigh being held slightly bent up towards the abdomen. The duration of time required to sufficiently warm the thermometer depends on the construction of the instrument, and varies from a half to five minutes; the more rapid the instrument the thinner is the glass, and the more liable to be broken; a five-minute thermometer is therefore best for household use, and must be kept in position carefully for the full time. It is hardly necessary to observe that the temperature cannot be accurately taken if left in for too short a period, and that the mercury will not rise above the proper point, however long the thermometer is left. The following rules should be followed in taking temperatures:—

1. Wash the thermometer in cold or tepid water; hot water will burst it.
2. Shake the mercury well down; to 95° .
3. Place the thermometer carefully in the mouth or armpit, and see that it is not shifted for five minutes.
4. Carefully read off the point to which the mercury has risen; this being easily forgotten, had better be immediately, written down.



FIG. 17.
CLINICAL
THERMOMETER.
The mercury
standing at 100.4° .

5. Wash the thermometer, and replace it in its case.

In disease the temperature may be either depressed or elevated.

Low temperatures are met with when the vitality is depressed from many causes, such as (1) considerable loss of blood; (2) starvation; (3) the wasting caused by some chronic diseases; (4) perforation of the intestine; (5) collapse due to disease, injury or poisons.

High temperatures accompany fevers, the reactionary stage after collapse due to injury or disease, injuries to the nervous system, and even during what must be called 'hysterical' affections. The symptoms which accompany elevation and depression of the temperature of the body have been already stated under the headings of collapse and fever.

PART IV

GENERAL PRINCIPLES AND METHODS
OF TREATMENT

INTRODUCTORY

IT has long been recognised that the human constitution has the power of self-restoration. Within certain limits noxious influences are resisted, poisons are thrown out, and the effects of most causes of disease are averted, irrespective of all interference of art. To this power the phrase *vis medicatrix nature* has been applied. Nature is, however, not always successful unaided, and she has to be assisted by art in order to control or hasten the methods of cure. It has been said that ‘Nature is a good physician, but a bad surgeon,’ and certainly severe illnesses are often completely recovered from with little or no medical aid, whereas injuries such as fractures and wounds, though they ultimately unite and heal, leave more or less deformity if left to themselves. In treating disease our efforts should be directed towards (1) placing the patient in such surroundings that his mind, body, and especially the organ or part diseased, enjoy rest; (2) protecting him from depressing influences such as the extremes of heat and cold and other causes of disease; (3) maintaining his strength by supplying him with suitable food and fresh air; and (4) by giving him remedies internally, and applying others externally.

CHAPTER I

NURSING AND THE MANAGEMENT OF THE SICK-ROOM

The Nurse—The Sick-Room—The Furniture—Helpless Cases, &c.

GOOD nurses, like poets, are born, not made. It must not be understood by this that skilled training and experience are to be undervalued, but that there are certain natural qualities necessary, for the absence of which no training, however careful and thorough, can compensate. Fortunately these qualities are present in many women and some men. A nurse should be watchful and patient, cheerful but quiet, proud of her calling but without conceit, and, above all, possess tact. Many a well-meaning and experienced nurse is a nuisance rather than a comfort in the sick-room, owing to a bustling, fussy, or dictatorial manner. She should be constantly observing but not anxious to display her knowledge. When working under the directions of a medical man she should keep careful notes for his information, answer questions briefly, faithfully carry out his instructions, and not hesitate to inform him if she has been unable to do so for any reason. She should without worrying the patient take the temperature and note the pulse and respirations at definite times. She should also note any peculiarities in the evacuations, the condition of the skin, the duration and the character of the sleep, and the quantity of food taken in the twenty-four hours. During convalescence the nurse must keep watch over herself and exercise the qualities of patience and cheerfulness even more than before ; the patient, wearied of the routine of the sick-room, and now conscious of his weakness and discomforts, becomes irritable and forgetful of what he owes to those who have nursed him. Trying though this is to the nurse, she must remember that it is a sign of returning strength, and that success is crowning her exertions.

Before enumerating the furniture and appliances of the sick-

room we would urge the importance of constant attention to the ordinary laws of hygiene; cleanliness and free ventilation, so necessary to the healthy, are indispensable to the sick.

THE SICK-ROOM

The sick-room, for the sake of quietness and pure air, should be in an upper storey of the house; it should be of good size, at least 150 square feet of floor space and over 1,000 cubic feet of air space being the minimum allowance for a sick person; the window should look southerly, so that light and sun-penetrated air may enter it. There should be a good-sized fireplace, and except in very hot weather, when the windows can be kept widely open, a fire constantly burning for the sake of ventilation. A thermometer should be hung on the wall near the head of the bed, and the temperature of the room kept as near 60° F. as possible both day and night.

Precautions should be taken against the accumulation of dust; the carpet should not fit the room, but consist of squares easily removed, shaken, and brought back, the edges being pinned down with large flat brass-headed pins to prevent them rucking up or slipping; the floor and furniture should be dusted daily with damp cloths, and not stirred up with the ordinary broom and duster. In infectious disease every unnecessary article of furniture must be removed, but for other cases the room should not be made to look too cheerless.

THE FURNITURE

The *bedstead*, of metal, placed out of the way of draughts from door or window, and accessible at both sides; it should be about 3 ft. 6 in. in width—it is difficult to move a helpless patient lying in a double-bed. It should be furnished with a woven wire mattress, a hair mattress, and over this a blanket, then a sheet. A square of mackintosh, and over it a 'draw-sheet,' are then arranged across the bed under the patient's shoulders and hips. A 'draw-sheet' consists of a sheet folded lengthways, so as to be about 3 ft. in breadth but the full length maintained, laid across the bed; one end is tucked in at one side and the extra length is

rolled up and tucked in at the other side of the bed. The object of this arrangement is that if the sheet becomes rucked up, heated, or uncomfortable, by untucking the rolled-up extra length on one side and pulling the sheet across by the other end on the opposite side, the patient lies on a fresh smooth surface, which gives him much comfort.

The bed covering must vary according to the time of year and the usual habits of the patient, but at night an extra blanket or woollen rug should be in readiness in case the temperature of the room falls unexpectedly, owing to a change in the direction of the wind, or the fire getting low. Patients suffering from diseases attended with profuse perspirations should wear a flannel night-dress opened all the way down, and the outer seams slit so as to allow it to be easily changed. The slit seams should be furnished with tapes for tying. A light shawl may be worn over the shoulders.

All the furniture of a sick-room should be on castors, especially the *washstand*, which can be thus wheeled beside the bed when the patient is to be washed, and moved out of the way afterwards.

Tables.—Of these there should be two, a small one reserved for nursing appliances—the medicine-glass, feeding-cup, spoons, &c., and a larger table for the patient's books, papers, flowers, and other comforts.

A *cupboard* with shelves for medicine bottles, lotions, and dressings. Medicine bottles should be kept on a separate shelf from those containing lotions and external applications. If a bottle contains poison or an important medicine, such as a sleeping draught, it is a good plan to run a long pin transversely through the top of the cork and leave it there. If the bottle is taken up carelessly or by mistake the pin attracts attention, but when intending to uncork the bottle the pin is easily avoided.

Screens are essential to protect the patient from draughts when he is being washed, and to shade him from the light when he wishes to sleep during the day without excluding air and light from the rest of the room. They should be 5 ft. in height, light, so as to be easily moved, but stand firmly, so as not to fall with a crash on the slightest touch when open.

A *sofa* or *easy chair* for use during convalescence, and one or two *Windsor chairs* for the nurse and visitors.

A *bed-pan* and *bed-urinal* must be provided for a patient who is unable to leave his bed, and a *commode* for one who may get up, but is confined to his room. Bed-pans are made of various shapes; for most cases the 'slipper' pan will be found more convenient than the old 'circular' form. If the need for a bed-pan suddenly arises and there is none handy a pillow may be placed under the buttocks, and a shallow basin or dish used. The basin of a commode, slop-pails, and bed-pans must always be fitted with covers and be made of glazed earthenware; those made of japanned tin are difficult to clean, and soon become foul. They should have some disinfectant placed in them before being used, and they should be covered up after use, removed from the room immediately, emptied (unless the contents are to be kept for inspection), thoroughly rinsed out, left to dry in a free current of air, and not brought back into the sick-room until wanted.

An *enema syringe* or *douche-can* is indispensable in many cases of illness, and should be kept in every house. An india-rubber *ball syringe* containing $1\frac{1}{2}$ to 3 oz. is useful for children and for the injection of small quantities of fluid, but when necessary to inject a large quantity of fluid a Higginson's syringe or a douche-can should be used.

A Higginson's syringe is a hollow rubber ball with a tube



FIG. 18.—HIGGINSON'S SYRINGE.

furnished with a valve, leading off from each side. One tube, from which the fluid flows, is fitted with a nozzle, the other tube is dipped into the vessel containing the fluid for injection. On

squeezing the ball the contained air is first driven out, and then as the ball expands the fluid is sucked up, and on again squeezing the ball, driven forward. A douche-can is a glass or tin receptacle with a capacity of from two to three pints, from the bottom of which comes a long india-rubber tube, furnished with a stop-cock or spring clip to shut off the stream. The can is held, or hung up against the wall, about 2 ft. above the level of the patient, and the fluid is injected by the force of gravity. Nozzles of various forms and materials can be fitted to the tube; when used for washing out wounds a glass nozzle is the best, as it can be purified by boiling.

The advantage of a douche-can over a Higginson's syringe is that there are no valves to get out of order, and that the fluid flows with an even stream, and without undue force unless the

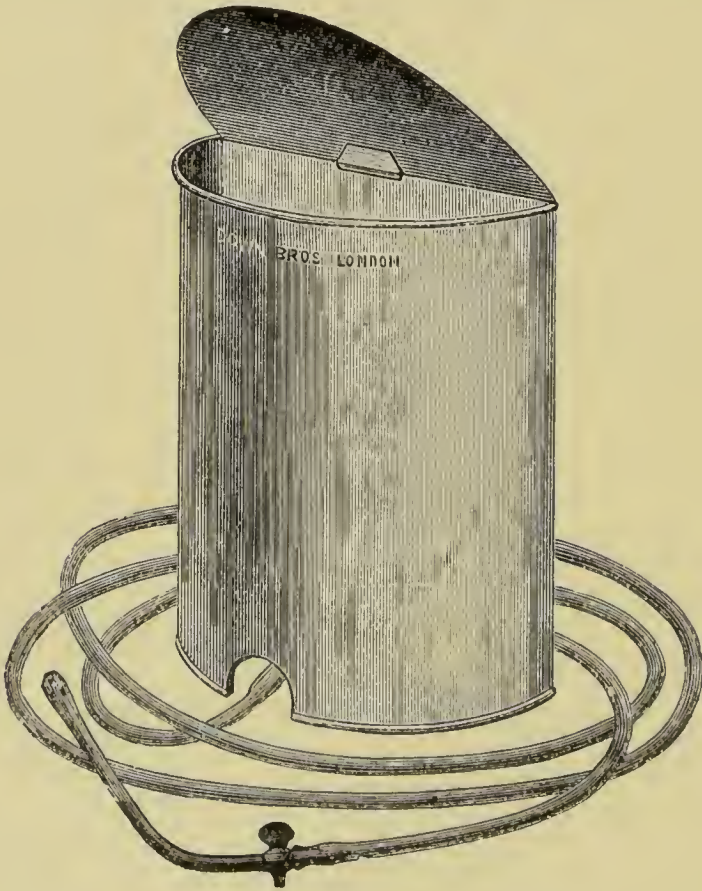


FIG. 19.—DOUCHE-CAN.

can is raised too high. A Higginson's syringe is often used much too forcibly, and if it has been put away and not used for some time the india-rubber perishes and the syringe becomes useless.

Feeding-cups made with a spout and a handle on each side are necessary for a patient who cannot sit up in bed. The contents of a tumbler are liable to be spilt, and when thirsty being fed with a spoon is a tedious process. A small teapot with a large spout may be used in the absence of a feeding-cup, but the handle is in the wrong position for the patient to hold. The feeding-cup must be kept scrupulously clean, and should be scalded out daily with soda and water; when milky food is given the greasy constituents coat the sides of the vessel, and especially the spout, if neglected. A young infant who is too ill to suck, or an unconscious patient, may be fed with a glass syringe to the nozzle of which two or three inches of india-rubber tubing are attached. The patient's head must be turned to one side, the tube passed to the back of the mouth, and a few drops of food introduced at intervals between the acts of swallowing by slowly pressing the piston.

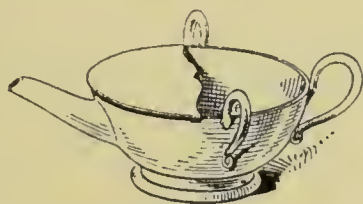


FIG. 20.—FEEDING-CUP.

Spitting-cups must be provided for patients with lung trouble, and some disinfectant placed in them, particularly when consumption is known or suspected to be present. They should be frequently emptied, and though it may appear objectionable, it is best to empty them into a bright fire in an adjoining room.

A *graduated porringer* of earthenware. This is very useful to contain fluids employed as enemas; also to measure the amount of urine passed in a given time.

A *spirit lamp*, *small kettle*, and *saucepan*, are invaluable for warming up food, and boiling water when the fire is low, or during the summer when there is usually none.

A *steam-kettle* with a long spout for certain cases of lung or throat trouble.

Air and water cushions are made of various sizes and shapes, and are applicable to a variety of uses. It must be remembered that water beds and cushions should always be filled with tepid water so as not to chill or overheat the patient, unless it is definitely necessary to apply heat or cold to a particular region.

A *cradle* may be wanted for keeping off the weight of the bedclothes. These are usually made of half-hoops of strong

wire fixed in wooden supports ; but a cradle to keep the clothes off the foot or leg may be improvised by removing the top and bottom from a band-box, and placing the limb through the hoop thus formed.

A *small hand-bell*, or some means of communication between the patient and the nurse, must be provided.

Medicine glasses, and scales and weights.

Clinical and bath thermometers.

HELPLESS CASES

To turn a patient on his side.—A patient as a rule is more comfortable lying on his *right* side, as the movements of the heart are not embarrassed. Cross the patient's left leg over his right, and place his left arm across his chest, then, standing on the right side of the bed, take hold of the left shoulder and hip and gently roll him towards yourself ; to turn him on his *left* side the right leg must be crossed over the left, and the right arm across the chest.

Lifting a full grown person in bed can only be done by two persons of ordinary strength standing one on each side of the bed. Each person passes one hand under the buttocks, the other under the shoulders, and they must both lift exactly together. It may be necessary to have a third person to support the head.

To make a bed without moving the patient from the horizontal position.—Mr. Cantlie gives the following directions :—Without removing the bedclothes, glide the patient to the edge of the bed next the fire. Place three or four bedroom chairs along that side of the bed with the backs next the fire. On the chairs lay a bolster or pillows until this temporary couch is on a level with the mattress. The nurse, reaching over the backs of the chairs, now glides the patient on to the improvised bed, where, covered over with blankets or a rug, the patient lies whilst the bed is being made. When the bed is made up, retain around the patient the blanket in which he is enveloped, and glide him back into bed ; remove the blanket around him when he is warm in bed.

Changing bed-linen.—First place the fresh sheets, ready warmed and aired, in a convenient position, then strip off the upper clothing and cover the patient with a blanket. Turn him

on his *right* side and strip up the under clothing from the *left* side of the bed, roll it up tightly towards the patient and push it well under his shoulders and buttocks. The clean sheet, draw-sheet, and mackintosh are now rolled up together lengthwise for half their width and placed close to the patient, the unrolled portion being smoothly spread over the *left* half of the bed. The patient is then turned on to his back and slightly on to his left side over the rolled-up linen ; the soiled linen is then pulled away and the clean roll drawn through and evenly spread over the *right* half of the bed and tucked in.

To remove body-linen.—First unfasten the collar, then pull the garment up over the head, and lastly take one arm out of one sleeve, then the other.

To put on clean body-linen.—Put the arms into the sleeves first, then put the garment over the head and draw it down front and back.

To wash a patient.—To wash the *head* and *face* : place a towel over the pillow to protect it. The *arms* and *legs* : wash each limb separately. Bare the limb and tuck the bedclothes well under, and protect them with a towel placed lengthwise. The *front* of the *body* : pull the night-shirt up and the bedclothes down, and tuck a towel on either side of the body to protect the sheets. The *back* : turn the patient on to his side and tuck a towel lengthwise under the shoulders and buttocks.

CHAPTER II

THE MANAGEMENT OF INFECTIOUS CASES

Degrees of Infection—Management—Disinfection.

THE degree of infectiousness of various diseases depends on the vitality of the microbes causing them, the surroundings of the patient, and the susceptibility of people coming in his neighbourhood. Diphtheria and erysipelas are rarely contracted by a healthy person in attendance on the sick, provided that the sick-room is light and well aired and the poison not directly inhaled or communicated by contact; but small-pox is intensely infectious, and, however perfect the hygienic surroundings may be, it will probably be contracted by the nurse unprotected by vaccination or a previous attack.

In dealing with infectious disease our object is to prevent the distribution of the microbes, to place them in an atmosphere which is unfavourable to their vitality, and by scrupulous cleanliness to remove any soil favourable for their growth.

As hot air, and with it dust and microbes, rises, the sick-room should be at the top of the house, and the pictures, curtains and carpet, and every unnecessary article of furniture which could harbour dust, removed. The contents of any wardrobe or chest of drawers must be turned out and the space used for putting away nursing appliances and the patient's clothes, and these should be as few as possible. It is well to devote the whole of this floor to the patient and his nurse, and remove the carpet from the staircase leading down to the next floor. When possible a stove should in winter be kept alight in the ground floor of the house and a window or sky-light kept open at the top, so that there is a constant current of warm air passing up through the house. A sheet should be nailed above and hang down outside the door of the sick-room, and this should be kept constantly wet with disinfecting solution (see Appendix.) A

glazed earthenware pail of this solution should be kept on the landing outside the room and renewed daily. The uses of the contents of this pail are: 1. To sprinkle over the sheet; 2. All plates, cups, &c., used by the patient, having first been washed by the nurse, are dipped into the pail before being taken downstairs, where they are again washed before food is placed in them to be taken upstairs.

The nurse should wear a plain linen dress, and a cap as far as possible covering and keeping the dust out of her hair. She should keep her clothes in two tin boxes—one for sick-room, the other for outdoor dress. When changing to go out she should place her working clothes in one box and close it, then, having taken a bath, open the other box and assume her outdoor dress.

The patient must be kept scrupulously clean, and every precaution be taken to prevent the buttocks becoming smeared with excrement, particularly if suffering from typhoid fever or cholera. The excretions of these patients must be received into vessels containing strong disinfectants (see Appendix) and any soiled linen must be immediately removed and soaked in disinfecting solution for two hours before being washed. If mattresses become contaminated with such excretions, they must be freely and immediately soused with disinfecting solution, and had better be destroyed when the illness is over.

Disinfection.—At the termination of the disease, the patient, his clothing, and everything he has used, and the room, must be carefully disinfected.

The patient.—When the period of infection is over a warm bath should be prepared for him in an adjoining room, with a complete suit of clothing and a bath towel placed in readiness. The patient, covered with a blanket only, is then brought in, and the nurse takes the blanket back to the sick-room immediately he has entered the bath. He is then thoroughly washed all over, special attention being given to the hair. He is then rubbed down, puts on the fresh clothing, and goes down to a room which has not been infected.

Clothing, &c.—In most large towns there are now steam disinfectors, and arrangements can be made with the authorities to have the clothing, bedding, &c., removed and subjected to

the action of super-heated steam. When this is not available all washable articles should be boiled for fifteen minutes, and then hung out in the sun to dry. Blankets, and clothing which cannot be boiled, should be baked in an oven for four hours. No ordinary house contains an oven large enough to bake a mattress, and if such bedding has been contaminated by the excretions of a patient it must be destroyed. If it has only been used and kept clean, it is probably sufficient to sponge it freely all over with disinfecting solution and leave it freely exposed to the wind and sun for twelve hours.

The sick-room.—This is usually effected by fumigation, which is far more certain if the atmosphere of the room is moist.

Requisites :

1. Soft soap and water. Scrubbing brushes.
2. Steam-kettle and methylated spirit.
3. Sulphur, 3 lb. for every 1,000 cubic feet of air space, broken up into small pieces.
4. A shallow iron pan.
5. A bowl of water, and two bricks.
6. Strips of paper, and paste.
7. Disinfecting solution.

Set the steam-kettle boiling whilst the room is being cleared of bedding and clothes, and then scrub the floor and the wood with soft soap and water. Before it has time to dry close the fireplace and windows and paste strips of paper over all the cracks and apertures. Now moisten the sulphur placed in the iron pan with spirit, stand it on the bricks in the bowl of water, and light it. Leave the room, close the door, and paste up the cracks on the outside. After twelve hours the room may be opened, but before entering it cover up the nose and mouth with a handkerchief, and then throw the windows widely open and allow free ventilation for twenty-four hours. The walls, bedstead, and furniture should be then wiped down with cloths dipped in disinfecting solution, and the ceiling had better be freshly white-washed.

CHAPTER III

THE FEEDING OF THE SICK

General Remarks—Diet for Children—Diet for Adults—Fluid Diet—Nutrient Enemas—Nutrient Suppositories—Recipes for Preparing Food for the Sick—Stimulants.

THE successful treatment of disease largely depends on a suitable diet. It is impossible to lay down rigid rules as to the feeding of the sick, the nature of the disease, the age and usual habits of the patient, having to be considered ; but we may follow certain broad principles.

When a previously active person is confined to bed or to his room, he is at rest and surrounded by an equable temperature, therefore his total expenditure of muscular energy and heat is diminished, and he requires less food.

When at rest his circulation and the movements of the stomach and intestine are less active, therefore his digestion is less vigorous, and the food must be of a kind easy of digestion.

When obstinate vomiting or disease of the stomach prevents absorption of nourishment, it is useless to persist in administering food by the mouth, and we must resort to feeding the patient by nutrient injections into the bowel ; the food in these cases must be specially prepared, as the lower bowel has very limited powers of digestion, though it readily absorbs fluid.

In certain diseases we may have to limit one or more of the elements of our ordinary food, such as starch and sugar in diabetes, meat and animal broth in rheumatic fever, fat in jaundice.

There is a common impression that fluid food is conducive to weakness, and the disease is often aggravated, or the progress of convalescence delayed, by the patient being overfed by anxious relatives. We must remember that food taken into the body and leaving it undigested is distinctly harmful, and a few tablespoonfuls of milk which can be absorbed are far more

strengthening than a mutton chop which causes pain and diarrhœa.

Though the sick require less food than the healthy, they should be fed at regular times, and with shorter intervals between the meals; it is most important in wasting diseases that some food should be given during the night, and it is particularly called for in the early hours of the morning, when vitality is at a low ebb.

Below are appended in tabular form four diets for children and adults. These are progressive diets—to which the names, 1. Fluid; 2. Slop; 3. Simple; and 4. Full, have been given—suitable for the various stages of most fevers and many other conditions, and they will be referred to under those names when various diseases are specially considered.

TABLE I
DIET FOR CHILDREN UNDER TEN YEARS

	Fluid diet	Slop diet	Simple diet	Full diet
Breakfast	2½ pints of milk, or milk and broth, in the 24 hours	Bread and milk or Bread, 3 oz. Butter, ¼ oz. Milk, ½ pint	Bread and milk or Bread, 4 oz. Butter, ¼ oz. Cocoa or milk, ½ pint	Bread and milk or Bread, 5 oz. Butter or dripping, ¼ oz. Cocoa, ½ pint
Mid-morning	6 oz. = 12 table-spoonfuls to be given every 3 hours, day and night	A drink of milk	A drink of milk	A drink of milk
Dinner		Broth or milk, ½ pint Rice or custard pudding	Fish or boiled chicken, 2 oz. Potatoes (mashed), 4 oz. or Mutton broth, with meat and vegetables in it, ½ pint Bread, 2 oz. Potatoes (mashed), 4 oz.	Meat (when cooked), 4 oz. Mashed potatoes, 6 oz. Green vegetables Bread, <i>ad lib.</i> Milky pudding
Tea		Same as breakfast	Same as breakfast	Same as breakfast
Supper		Bread and milk, ½ pint	Bread and milk, ½ pint or Gruel, ½ pint	Bread and milk, ½ pint or Gruel, ½ pint

TABLE II
DIET FOR ADULTS

	Fluid diet	Slop diet	Simple diet	Full diet
Breakfast	3 to 3½ pints of milk, or milk and broth, in the 24 hours 8 oz. = 16 table-spoonfuls to be given every 3 hours, day and night	Tea or cocoa, with sugar and milk, $\frac{3}{4}$ pint Bread, 4 oz. Butter, $\frac{1}{2}$ oz. or Bread and milk, $\frac{3}{4}$ pint	Tea or cocoa with, sugar and milk, $\frac{3}{4}$ pint Bread, 4 oz. Butter, $\frac{1}{2}$ oz. or Bread and milk, $\frac{3}{4}$ pint	Tea or coffee, with sugar and milk, $\frac{3}{4}$ pint Bread, 4 oz. Butter, $\frac{1}{2}$ oz. or Bread and milk, $\frac{3}{4}$ pint Bread and butter, <i>ad lib.</i>
Mid-morning		A drink of milk	A drink of milk	A drink of milk
Dinner		Milk, $\frac{1}{2}$ pint, or broth, 1 pint, with custard, tapioca, or rice pudding, 4 oz.	Boiled fish or chicken, 4 oz. Mashed potatoes Custard, rice, sago, or tapioca pudding, 4 oz. Bread, <i>ad lib.</i>	Meat (cooked), 6 oz. Vegetables, 4 oz. Pudding, 6 oz. Bread, <i>ad lib.</i> or Broth, 1 pint Meat (cooked), 4 oz. Pudding, 6 oz.
Tea		Same as breakfast	Same as breakfast	Same as breakfast
Supper		Gruel, broth, or milk or Bread and milk, $\frac{3}{4}$ pint	Gruel, broth, or milk or Bread and milk, $\frac{3}{4}$ pint	Gruel, broth, or milk or Bread and milk, $\frac{3}{4}$ pint

Remarks on fluid diet.—Unless distinctly contra-indicated, it is best to give milk and broth alternately, as by so doing the monotony is relieved, and there is less chance of disturbing the digestion. Fresh milk is infinitely preferable to condensed milk, and should be used whenever procurable; it should be scalded and diluted with barley-water to the extent of one-third or one-half. If *diarrhoea* be present, dilute the milk with lime-water and barley-water in equal quantities. If there be *constipation*, instead of the lime-water add one tea-spoonful of bicarbonate of soda to each pint of milk and barley-water.

Nutrient enemias.—When the stomach is unable to digest or even to retain food, or requires rest, as in gastritis and ulceration of the stomach, the patient may be fed by the bowel. In order that the food may be absorbed, it must be previously digested by artificial means before it is injected. There are many preparations sold which digest food; Benger's pancreatic fluid and Fairchild's zymising powders are both excellent if the printed instructions are followed. The methods of using them vary somewhat in detail, but the outline is the same in all. The digestive preparation is mixed with the food, and gently warmed up to 140° F.; on no account must it be allowed to boil. It is then allowed to stand in a warm place, so as to keep the mixture at a temperature of 100° F. for two hours. It is then boiled for a minute or two, so as to stop the digestive process, and allowed to cool before injection. The foods most suitable for injection are eggs, milk, and beef-tea. If brandy is required it should be added just before injecting the mixture.

Quantity.—Small quantities, five ounces, should be used at first, until the bowel becomes tolerant of the injection. This may be gradually increased; as large a quantity as a pint of milk, two eggs, and two tablespoonfuls of brandy is often retained and absorbed.

Times of injection.—It is best only to give two injections at first, and never more than four, in the twenty-four hours.

Before giving the first injection it is essential to ascertain that the bowel is empty. If there is any doubt on this point it should be cleared with a soap-and-water enema, and an interval of half an hour allowed to elapse before giving the nutrient injection. The bowel should be washed out at least every second day as long as this method of feeding is employed. In giving the nutrient injection a syringe with a long nozzle should be used, so as to introduce the fluid high up into the bowel, and the syringe compressed very gently, so as to allow the fluid to flow in very slowly, and not distend the intestine.

Nutrient suppositories, made of prepared meat and milk, are sold. They may be used when enemias are ill-retained. The bowel must be washed out once in the twenty-four hours.

RECIPES FOR PREPARING FOOD FOR THE SICK

Whey.—Warm a pint of milk to a temperature of 100° F. Add a teaspoonful of ‘artificial rennet’ (Benger’s). Let it stand in a warm place till curdling has taken place; then strain through fine muslin, and boil the whey for one minute to destroy the ferment.

Whey and cream mixture.—Cream, one tablespoonful; whey, two tablespoonfuls; warm water, two tablespoonfuls; sugar, one small teaspoonful.

Peptonised milk, soups, and beef tea are made in the same way as nutrient enemas, already described.

Coffee whey.—Whey, one quarter pint; strong black coffee, one tablespoonful; cream, one tablespoonful; sugar, according to taste. The mixture may be cooled in ice.

Milk tea.—Add boiling water (one tablespoonful) to tea (one tablespoonful) in a well-warmed cup. Let it stand for two minutes; strain off from the leaves, and add the fluid to hot milk (half a pint).

‘*Imperial drink*.’—To a quart of boiling water add cream of tartar (two teaspoonfuls), the juice of two lemons, and sweeten with honey or sugar. It may stand on ice until cold.

Lime-water.—Take a lump of freshly burned lime, about the size of an orange, and slake it by sprinkling water upon it. Put the crumbled lime into a gallon jar; fill it up with water; cork it tightly, and shake it for two or three minutes. After twelve hours the clear solution may be poured off, and used as required.

Barley-water.—Add one tablespoonful of pearl barley to a pint of water, and boil for a few minutes, stirring constantly to wash the grain. Pour off the water, and add one pint and a half of clean water; simmer gently for one hour, and strain. Sugar and lemon-juice may be added.

Arrowroot-water.—Take two teaspoonfuls of arrowroot, and make it into a smooth paste with a little water; add one pint of water, and simmer for five minutes, stirring constantly.

Arrowroot or cornflour and milk.—Mix two teaspoonfuls with a little cold water, till it is quite smooth. Boil half a

pint of milk; pour it on the arrowroot or cornflour while boiling, stirring constantly.

Beef tea.—Take one pound of beefsteak or gravy beef free from fat; mince or cut it into small pieces; put it in a well-covered jar with a pint and a half of cold water or barley-water; place the jar in a saucepan of water, and simmer for three hours; or the jar may be left in a *warm*, not too hot, oven all night. Strain, and remove fat.

Veal or chicken tea is made in the same way.

Raw meat-juice.—Take a pound of rump steak; free it from skin and fat, and mince it finely. Place it in an earthenware vessel, and pour on enough *cold* water to cover it. Let it stand for four hours. Strain through muslin, and add a little sugar or salt.

Meat broths are made by boiling meat and water, in the proportion of one pound to the quart, together with vegetables, cabbage, carrots, turnips, celery, or pearl-barley, for three hours. The broth is then either strained through fine muslin, or the meat and vegetables, together with the broth, taken according to the condition of the patient.

Potato-soup.—Peel two medium-sized potatoes, and place them in one pint of cold milk. Let it simmer gently till the potatoes are quite soft; then strain through fine muslin, and add *cream* (two tablespoonfuls).

STIMULANTS

In spite of the doubt as to whether alcohol is a true food in health, it forms part of the diet during the treatment of so many diseases that it is preferable to consider it as a food rather than a medicine. It is always best to give it with food, and during acute wasting diseases it should be given in small doses, largely diluted, at frequent intervals. It must be given with great caution to children; comparatively infinitesimal doses, such as three drops of brandy every two hours, produce markedly beneficial effects in young infants, but one dose of a teaspoonful, or even half that quantity, may be followed by insensibility due to alcoholic poisoning.

For adults from two to three ounces is the average dose in the twenty-four hours, and six ounces the maximum. Larger

quantities are sometimes given, but this should only be under medical advice and supervision.

The form of alcohol selected is not of much importance, but it must be of good quality. Brandy or whisky (good brandy is expensive) are to be preferred during the actual progress of disease, and light wine or bitter ale during convalescence.

The indications for giving alcohol are :—

1. Sudden heart failure; fainting from exhaustion, shock, or loss of blood.

2. Progressive heart failure; exhaustion as shown by a feeble, irregular pulse, dry tongue, muttering delirium, profuse perspirations.

3. During acute exhausting diseases, such as typhoid, diphtheria, and erysipelas.

4. To aid digestion during convalescence and in chronic wasting diseases, such as consumption.

5. Many forms of poisoning, particularly snake-bites.

Alcohol should not be given :—

1. After injuries to the head.

2. When there is severe headache, flushed face, hard large pulse, and wild delirium.

3. It should be discontinued if the tongue becomes drier, the restlessness increases, and the breath smells of alcohol.

The following are useful mixtures of food and alcohol for the sick :—

1. *Wine-whey*.—Pour a half-pint of sherry into a pint of boiling milk; stir thoroughly until coagulation has occurred. Strain off the whey, and sweeten, or not, according to taste.

2. *Mulled wine*.—Beat up an egg with six tablespoonfuls of sherry, gradually adding an equal quantity of boiling water.

3. *Milk punch*.—Add the dose (a dessertspoonful to two tablespoonfuls) of brandy or whisky to six ounces (twelve tablespoonfuls) of milk, and add sugar and nutmeg, according to taste.

4. *Egg-nog*.—Beat up the yolk of an egg with six ounces of milk; add the dose of brandy or whisky, and some sugar. Then beat up the white of the egg and add it.

A tablespoonful of lime-water added to the last two mixtures makes them more easy of digestion.

5. *Egg jelly*.—Take three new-laid eggs; separate the whites from the yolks, and beat them up separately. Dissolve isinglass (half-ounce) in warm water (quarter-pint), and add the juice of half a lemon. Mix all together, and add brandy (two tablespoonfuls) or champagne (one glass); pour into a mould, and cool on ice.

CHAPTER IV

THE TREATMENT OF DISEASE BY MEDICINES

Internal Remedies:—Administration; Weights, Measures, and Signs used; Doses for Children; Classification of Medicines; Cautions; Tables of Doses—Enemas and Suppositories—Gargles—Lozenges—Inhalations.

THE depressing methods of treating disease as practised by our ancestors, such as bleeding, administering emetics and purges, and low diet, are now rarely resorted to. In the early stages of acute inflammatory affections occurring in vigorous people, suffering is diminished by modifying the forcible action of the heart, by promoting free perspiration and clearing the bowels, but all depressing remedies must be used with the greatest caution, particularly in infants and old people. Of recent years the field of our knowledge of the treatment of disease has been greatly extended, but many remedies can only be safely used by skilled hands, and it would be the height of folly for anyone without special training to attempt to employ them. We allude particularly to the injection of various fluids which directly counteract the action of certain disease-producing microbes. The line of treatment adopted in this work is mainly that which has been called the ‘expectant treatment,’ and consists in supporting the patient’s strength by suitable food, and giving medicines which aid and direct the efforts of Nature to eliminate disease by the organs of excretion. Those drugs which counteract the progress of disease by direct action and which can be safely used are also described. It is impossible in a work of this description to give a complete list of existing medicines and to describe how they should be intelligently and safely used. The amateur carpenter does the best work who selects a few simple tools and learns how to use them, and the amateur doctor can do much with simple remedies.

A word of caution must be given against the habit of taking medicine immediately the smallest bodily discomfort arises. It is notorious that doctors seldom prescribe for their own ailments. This is not because they doubt their own skill or the utility of medicines, but because it is almost impossible for anyone to estimate his own morbid sensations accurately and draw correct deductions from them. The habit of constantly taking medicine often produces a condition which affects both mind and body, and is infinitely more burdensome than the original ailment. Children are far too often dosed with medicine. How often a child may be seen wisely refusing food and keeping quiet, owing to some stomach derangement which will pass off if he is allowed to manage himself in the way which Nature dictates; but too often the anxious mother compels him to eat and administers a purge which irritates the organs requiring rest.

THE ADMINISTRATION OF MEDICINE

Medicines may be given by the mouth or by the bowel, but as a general rule double the ordinary dose must be administered by the bowel to obtain the same effect as when the drug is absorbed by the stomach.

Medicines are usually given dissolved in water in the form of mixtures, as pills, or as powders. Mixtures are used for soluble drugs, and when rapid absorption is desired. Pills are a convenient form of taking small doses of nauseous medicines, or when it is desired that they should be slowly absorbed, or act on the intestine rather than on the stomach. Powders are given when rapid absorption is desired, and the drugs are either insoluble or too bulky to be made into pills.

Very many drugs are now sold in given doses compressed into small pellets called *tabloids*. These are most convenient for household and travellers' use, as they do away with the necessity for scales, and they keep well in most climates. Many are soluble and can be taken in water; the insoluble tabloids may be swallowed as pills, or crushed and taken as powders when a more rapid action is desired.

Medicines are administered by the bowel in the form of *injections* or *suppositories*. The injections should be small in quantity, not exceeding two ounces, introduced slowly, or they

may be rejected. Suppositories are conical-shaped masses about half an inch in diameter, containing the drug mixed with fatty substances which dissolve after introduction into the bowel.

When medicine is ordered or designed to be given at certain intervals, it should, in general, be given as punctually as possible ; but in very few, and these exceptional, cases should it be allowed to interfere with sleep. It is often necessary to awaken a patient for food, rarely for medicine.

Time of administration.—When rapid action is desired, medicines should be given on an empty stomach. Purgatives act soonest when given before breakfast. Most tonics should be given on a full stomach, when the process of digestion is most vigorous, as, by so doing, they become mixed up with the food, and more completely absorbed. Some drugs have a completely different action if given before or after a meal, *e.g.* alkalis given on an empty stomach increase the secretion of the acid gastric juice, but diminish the acidity when given after a meal.

Doses.—A single large dose of a medicine is given if rapid action is required, as when purging or vomiting is intended. When more gradual and lasting effects are desired, the medicine is best given divided into doses and distributed at intervals of some hours. Thus tonics are usually given every eight or six hours, *i.e.* three or four times a day. The dose must be regulated according to the age and habits of the patient. If a man is accustomed to take stimulants in his ordinary life, he requires far larger doses of alcohol than the teetotaller to stimulate him. A man accustomed to opium or quinine can, with impunity, take a dose which would produce marked symptoms of poisoning in a person unaccustomed to these drugs. Children are sensitive to some drugs, very tolerant to others. *Opium* must be given to them with the utmost caution, as even minute doses will sometimes produce profound insensibility. They can take *belladonna* and *mercury* in doses quite out of proportion to their age and size. There are many ways of calculating the dose for a child in proportion to that for an adult. Infants under six months require very minute doses equivalent to about one-twentieth of an adult's. The following tables show the weights, measures, and signs used, and how to approximate doses according to the age of patients.

WEIGHTS AND MEASURES, WITH THE ABBREVIATIONS AND SIGNS USED IN PRESCRIPTIONS

WEIGHTS

gr.	= a grain
℥	= a scruple = twenty grains (grs. xx)
ʒ	= a drachm = three scruples (℥iij) = 60 grs.
℥	= an ounce = eight drachms (ʒviij) = 480 grs.
lb	= a pound = twelve ounces (℥xij) = 5760 grs.

MEASURES

℥	= a minim
f ʒ	= a fluid drachm = 60 minims (℥lx)
f ℥	= a fluid ounce = 8 fluid drachms (f ʒviij) = 480 ℥
O	= a pint = 20 fluid ounces (f ℥xx)
C	= a gallon = 8 pints

The scruple sign and weight are now rarely used, and the 'f' meaning 'fluid' is constantly omitted before fluid drachms and ounces. The other signs and weights are habitually used, in spite of the recommendation of the 'British Pharmacopœia' that they should be abandoned, and the following scale adopted:—

1 Grain	gr.
1 ounce	oz. = 437·5 grains
1 pound	lb. = 7000 grains

Medicines should always be measured in properly graduated glass vessels, which may be purchased for a few pence. Two measures are necessary. (1) A minim measure graduated from five minims to sixty; (2) a drachm measure graduated from one up to sixteen drachms, *i.e.* two ounces; this measure is also usually graduated in dessert and table spoonfuls.

A minim is popularly supposed to be equal to a drop, but this is most fallacious, as few fluids drop in the same proportion, and a drop is usually much less than a minim.

A teaspoonful	is supposed to be equal to one fluid drachm
A dessertspoonful	„ „ „ two fluid drachms
A tablespoonful	„ „ „ half an ounce
A sherry-glassful	„ „ „ two ounces
A claret-glassful or teacup	„ „ „ five ounces
A dinner-tumbler	„ „ „ half a pint
A breakfast-cup	„ „ „ eight ounces

All these vessels vary much in size, and they should not be relied upon unless their capacity has been carefully measured.

The abbreviations 'aa' = of each, and 'ss' = a half, are frequently used in prescriptions.

TABLE OF DOSES ACCORDING TO THE AGES
OF PATIENTS

Ages	Propor- tions	Doses	
For an adult, suppose the dose is	{	One drachm, 60 grs. or minims.	or One ounce
A child under			
6 months will require only	$\frac{1}{20}$	3 grs. or ℥	24 grs. or ℥
1 year " " "	$\frac{1}{12}$	5 " "	40 " "
2 years " " "	$\frac{1}{8}$	7 $\frac{1}{2}$ " "	1 drachm.
3 " " " "	$\frac{1}{6}$	10 " "	1 $\frac{1}{2}$ "
4 " " " "	$\frac{1}{4}$	15 " "	2 "
7 " " " "	$\frac{1}{3}$	20 " "	2 $\frac{1}{2}$ "
14 " " " "	$\frac{1}{2}$	30 " "	4 "
20 " " " "	$\frac{2}{3}$	40 " "	6 "
Above 21, the full dose			

For old persons, after sixty-five, it is sometimes desirable to diminish the doses of medicines in somewhat nearly the inverse proportion. This is only a very general and by no means a precise rule. The best guide is experience of the constitution in all cases.

When, on giving the first dose of a prescription, it is found to produce effects not intended, *e.g.* vomiting, severe purging, or stupor, it is best to make the next dose only half the quantity at the hours appointed until the physician can be consulted. When the effects are extreme, it should be suspended altogether with the same object.

The medicines which have been selected will probably meet all ordinary requirements, and can be safely used with the exercise of common care. With the exception of *opium* all the more active poisons have been excluded, as being unsuitable for use without skilled supervision. *Those which require more than ordinary care are printed in italics*, and the contra-indications to their use and the signs of their not agreeing are given. The medicines are first grouped according to the effects they produce on the system. At first sight this may appear a formidable list, but it should be noted that the same drug often appears under several headings, and sometimes produces directly opposite results according to the dose. Thus rhubarb and castor-oil are astringent in small doses, purgative in large doses. Ipecacuanha in minute quantities checks some forms of vomiting, in

moderate doses acts as a diaphoretic and expectorant ; large doses cause vomiting, and for some inexplicable reason are apparently astringent in dysentery.

The medicines are then arranged in an alphabetical list together with their ordinary doses as for an adult. The method of calculating a dose for a child has already been given.

CLASSIFICATION OF MEDICINES

Antacids are almost solely employed for neutralising the acidity of the stomach and intestines in cases of dyspepsia.

Ammonia	{ Aromatic spirits of (Sal volatile)	m10-31
	{ Carbonate of	gr. 1-5
Lime	Lime water	3½-54
Chalk	Mercury and chalk powder (Grey powder)	gr. 1-3
Magnesia	{ Oxide of	gr. 5-31
	{ Carbonate of	gr. 5-31
	{ Fluid	32-31
Potash	Bicarbonate of	gr. 5-20
Soda	Bicarbonate of	gr. 5-30

Astringents check the secretions by their action on the blood-vessels. They cause irritation if used too freely.

Acids	{ Dilute hydrochloric	m5-20
	{ „ nitric	m5-20
	{ „ sulphuric	m5-20
Alum .	. . . . .	gr. 5-15
Catechu	Tincture of	m10-31
Iron	{ Tincture of perchloride of	m5-20
	{ Sulphate of	gr. 1-5
Opium	Tincture of, m4-20 (in combination with catechu and dil. sulphuric acid).	

Diaphoretics are drugs which cause perspiration, and are chiefly used (1) in fever, to reduce the temperature by directing the fluid from the deep organs to the skin ; (2) to relieve the kidneys by promoting the excretions by the skin.

Warm drinks	{ Weak spirits and water.	
	{ Hot lemonade.	
	{ „ barley-water.	
Ammonia	Liquor of acetate of	31-3½
'Dover's powder' (Compound ipecac. powder)	. . . . .	gr. 2-10
Potash	{ Citrate of	gr. 20-60
	{ Nitrate of	gr. 5-20
	{ Acid tartrate of (Cream of tartar)	gr. 20-60

Diuretics increase the secretion of urine, and are used to rid the body of waste products, prevent the formation of stone or gravel in the kidneys and urinary tract, and diminish irritation in these passages.

Large draughts of water.

Heart stimulants.

Squills	Tincture of	℥10-25
Potash	{ Nitrate of	gr. 5-20
	{ Citrate of	gr. 20-60
	{ Acid tartrate of (Cream of tartar)	gr. 20-60
Lithia	Citrate of	gr. 5-10

Emetics are drugs which cause vomiting, and are used (1) to unload the stomach, to relieve pain due to indigestible food, and to evacuate poisons; (2) to dislodge substances from the respiratory passages such as accumulations of mucus and diphtheritic membrane. Emetics should not be given in inflammatory diseases of the brain or stomach, nor during pregnancy.

Large quantities of tepid water (1-2 pints) and table salt (2-4 tablespoonfuls).
Mustard, 2 teaspoonfuls, tepid water, $\frac{1}{2}$ pint.

Zinc sulphate, gr. 30. Water, \mathfrak{z} 2, in cases of poisoning.

Ipecacuanha { in powder (*not Dover's powder*), gr. 15-30.
Wine, \mathfrak{z} 3-6.

Expectorants influence the secretions of the respiratory mucous membrane. There are two classes:—

1. Sedative, used in the early stages of inflammatory affections.

Inhalations of steam.

The diaphoretics.

Ipecacuanha wine ℥5-30.

2. Stimulating, only used when fever is absent.

Ammonia	Carbonate of	gr. 2-5
Senega	Tincture of	℥20-5i.
Squills	Tincture of	℥10-25
Tolu	{ Syrup of	℥10-30
	{ Tincture of	℥15-5j

Narcotics are drugs which relieve pain or induce sleep. They are all harmful if taken habitually, and their efficacy decreases and their baneful effects increase the longer they are taken. Self-administration of narcotics cannot be too strongly condemned, and should only be resorted to under the most

urgent circumstances. The relief of pain should always be attempted by external applications, and simple wakefulness treated on ordinary lines (see SLEEPLESSNESS) before resorting to drugs. Children are extremely susceptible to their influence, and young infants should not be given opium in any form except under medical advice.

<i>Opium</i>	{	<i>Extract of</i>	gr. $\frac{1}{4}$ –1
		<i>Tincture of</i> (' <i>Laudanum</i> ')	m2–15
		<i>Compound ipecac. powder</i> (<i>Dover's powder</i>)	gr. 2–10
<i>Antipyrin</i>			gr. 2–10
<i>Potassium</i>		<i>Bromide of</i>	gr. 5–20
<i>Sodium</i>		<i>Salicylate of</i>	gr. 5–20
<i>Phenacetin</i>			gr. 2–10

Purgatives are given (1) to unload the bowel, (2) to remove indigestible and irritating substances, (3) to cause free secretion from the intestinal mucous membrane and digestive organs, and so relieve congestion of other parts. It is easy to produce purging, but often difficult to find a mild but effectual aperient for ordinary constipation. Personal idiosyncrasy and habit make it impossible to lay down the exact dose which will produce a particular effect, but in the following table the more commonly used drugs with their doses have been arranged under three headings:—(1) Laxatives, *i.e.* substances which cause only slightly increased action of the bowels, the motion being solid though softened. (2) Free aperients, which produce one or more fluid motions. (3) Active purges, which cause a profuse flow of fluid from the bowel.

Salines are best given largely diluted with water on an empty stomach, particularly before breakfast; pills should be taken at bedtime, and preparations of mercury at night, followed by a saline next morning. When there has been no action for two or more days in spite of aperients, an enema should be given, and repeated if necessary, instead of increasing the dose or resorting to a more active drug.

The following laxatives or mild aperients are useful preparations. The dose largely depends on the idiosyncrasy of the person, but they are all more active if taken with hot water:—Carlsbad salt (artificial) consists chiefly of sulphate and bicarbonate of soda, dose 20 to 60 grains. Granular effervescent citrate of magnesia, dose 1 teaspoonful or more. Püllna, Friedrichshall, Hunyadi-Janos, and Æsculap waters all contain

sulphates of magnesia and soda. Their strength varies in the order given above, Püllna being the weakest and Æsculap the strongest. The dose of each is a small wineglassful or more in hot water.

PURGATIVES

1. Laxatives	2. Free Aperients	3. Active Purges
Whole-meal bread	Colocynth	
Porridge	and Hyos-	
Figs, prunes, and fresh fruits	c y a m u s	
	Pill . . . gr. 3-5	. . . gr. 10
	Mercury—	
	'Blue pill' . gr. 3-5	. . . gr. 8
	'Grey pow-	
	der' . . . gr. 1-3	. . . gr. 8
	Calomel . gr. $\frac{1}{2}$ -2	. . . gr. 5
Aloes—		
Aloin . . . gr. $\frac{1}{4}$ -1	. . . gr. 2-4	Jalap, Com-
Pill aloes and myrrh gr. 5	. . . gr. 10	pound pow-
Compound decoction $\bar{5}2\text{--}\bar{5}\frac{1}{2}$	. . . $\bar{5}1$	der . . . gr. 20-60
Cascara sagrada—		
Extract . . . gr. 1-2	. . . gr. 3-4	
Liquid extract . . m10-30	. . . m60	
Castor Oil . . . m30-52	. . . $\bar{5}\frac{1}{2}\text{--}\bar{5}1$	
Glycerine . . . m10-52		
Magnesia—		
Carbonate . . . gr. 10-20	. . . $\bar{5}1$	
Fluid . . . $\bar{5}2\text{--}4$	. . . $\bar{5}1\text{--}2$	
Sulphate . . . gr. 20-60	. . . $\bar{5}2\text{--}4$	
Rhubarb—		
Powder . . . gr. 5-10	. . . gr. 10-20	
Tincture . . . $\bar{5}1\text{--}2$	. . . $\bar{5}\frac{1}{2}\text{--}1$	
Syrup . . . $\bar{5}1\text{--}2$	. . . $\bar{5}3\text{--}4$	
Compound powder . gr. 10-30	. . . $\bar{5}1$	
Compound pill . gr. 2-5	. . . gr. 10	
Soda, Sulphate of . $\bar{5}1\text{--}2$	. . . $\bar{5}\frac{1}{2}\text{--}1$	
Senna—		
Confection . . . gr. 30-60	. . . $\bar{5}2$	
Compound mixture		
(Black Draught) . . . .	. . . $\bar{5}\frac{1}{2}$	. . . $\bar{5}1\text{--}\bar{5}1\frac{1}{2}$
Liquorice—		
Compound powder . gr. 20-30	. . . $\bar{5}1$	
	Seidlitz powders	

Seidlitz powders contain tartrate and bicarbonate of soda in the blue paper, tartaric acid in the white paper. The contents of the blue paper should be first dissolved in half a tumbler of water, and the contents of the white paper then added.

Refrigerants or **antipyretics** are used to reduce the abnormal heat of the body during fever. Some act by inducing perspiration, others by acting on the blood and nervous system. The reduction of temperature by drugs requires great care and discretion, as they all, even quinine in large doses, depress the heart's action. When the temperature is dangerously high, it is far safer to trust to sponging and wet packs. The administration of *aconite* by unskilled persons for every variety of febrile attack is often attended by danger, and this drug is not suitable for household use.

The diaphoretics.

<i>Antipyrin</i>	gr. 2-10
Quinine in large doses	gr. 5-10
Salicin	gr. 10-20
Salicylate of Soda	gr. 10-20
<i>Phenacetin</i>	gr. 5-10
'Warburg's Fever Tincture,' containing quinine, aloes, rhubarb, minute quantities of opium, cam- phor, &c.	
	51-4

Sedatives are drugs which modify or depress the functions of the organs.

1. Vascular sedatives are used to moderate the action of the heart and blood-vessels in inflammatory conditions of the body.

<i>Colchicum</i>	{ Extract	gr. $\frac{1}{2}$ -2
	{ Wine	℥5-20
Ipecacuanha	{ Wine	℥5-40
	{ Compound powder (<i>Dover's</i>)	gr. 5-10
Potassium	{ Bromide	gr. 5-20
	{ Nitrate	gr. 5-20

2. Nerve sedatives are used in irritable conditions of the spinal cord and in hysteria.

Ammonia	{ Bromide	gr. 2-15
	{ Aromatic spirits (<i>Sal volatile</i>)	℥10-51
Potassium bromide		gr. 5-20
Valerian, ammoniated tincture		℥10-51

3. Pulmonary sedatives.

<i>Opium</i>	{ Tincture (<i>Laudanum</i>)	℥4-20
	{ 'Paregoric,' (compound camphor tinc- ture)	℥10-30
	{ <i>Dover's</i> (compound ipecac.) powder	gr. 5-10
Ammonia bromide		gr. 2-15
Potassium bromide		gr. 5-20

4. Stomachic and intestinal sedatives.

Antacids, which see	
Bismuth carbonate	gr. 5-20
Potassium bromide	gr. 5-20
Ipecacuanha wine	m2-5
Opium { 'Chlorodyne' ¹	m5-15
{ see Pulmonary Sedatives.	

Stimulants are drugs which increase the vital functions ; the effect is usually transitory.

Alcohol.	
Æther, spirits of	m20-31
Ammonia, aromatic spirits (Sal volatile)	m10-31
Chloroform, spirits	m5-30
Opium in small doses.	
Nux Vomica { Tincture	m3-10
{ Extract	gr. ¼-1

Stomachic stimulants are used to allay pain due to spasm, flatulence, and indigestion. They are often given in combination with antacids and stomachic tonics. They mainly consist of volatile aromatic oils or spirits, and are called Carminatives.

Æther, spirits of	m20-31
Ammonia, aromatic spirits	m10-31
Dill water	31-32
Cardamoms, compound tincture	m20-31
Cloves, infusion of	31-32
Cinnamon water	31-32
Peppermint { Water	31-32
{ Essence	m10-20
Pepper, confection of	gr 30-31
{ Powdered	gr 10-20
Ginger { Tincture	m15-31
{ Syrup	m15-31

Tonics.—Medicines which impart vigour to the body or certain organs. Their influence must always be helped by attention to diet, fresh air, and the general laws of hygiene. In giving tonics, attention must first be paid to the condition of the digestive organs, as if these are deranged improvement cannot be expected. Iron is an essential ingredient in most tonics, and can usually be taken if the right form is selected.

¹ Chlorodyne contains morphia, chloroform and spirit, together with minute doses of other drugs, suspended in treacle and liquorice. The 'British Pharmacopœia' contains a 'Tincture of chloroform and morphia' in imitation of it.

1. Tonics acting chiefly on the digestive organs.

Laxatives.

Acids . . .	{	Dilute hydroehloric	m5-20
		Dilute nitric	m5-20
		Dilute nitro-hydroehloric	m5-15
Calumba . . .	{	Tincture	m10-31
		Infusion	32-31
Gentian . . .	{	Compound tincture	m10-31
		„ infusion	32-31
Quassia . . .	{	Tincture	m10-31
		Infusion	32-31
		Reduced	gr. 1-5
Iron	{	Sulphate	gr. $\frac{1}{2}$ -3
		Citrate of iron and ammonia	gr. 2-10
		Citrate of iron and quinine	gr. 2-10
		Wine	31-4
Quinine . . .	{	Sulphate	gr. 1-2
		Ammoniated tincture	m30-31
<i>Nux vomica</i> . . .	{	Tincture	m3-10
		Extract	gr. $\frac{1}{4}$ -1

2. Those acting on the blood and vessels.

Iron . . .	{	See First Group.
<i>Nux Vomica</i> . . .		
Quinine . . .		

3. Those acting on the nerves and muscular system. It may seem paradoxical, but the drugs mentioned under the heading of sedatives (see Sedatives, group 2) are often more effectual than the true tonics. The most valuable nerve tonic in certain conditions is *Arsenic*, but this should only be used under the advice and supervision of a physician. Those more suitable for general use are—

Iron . . .	{	See First Group.
<i>Nux Vomica</i> . . .		
Quinine . . .		

Specifics are medicines which exert a special influence in certain diseases. Their influence is shown by diminution of the symptoms produced by the disease without causing any obvious alteration in the bodily functions, such as sweating, vomiting, or purging. As illustrations of specifics we may mention the following substances:—

- Lemon-juice, fresh animal and vegetable foods, in scurvy.
- Cod-liver oil in rickets and malnutrition.
- Colchicum in acute gout.

Bromide of potassium in epilepsy.

Iron in anæmia.

Perchloride of iron in erysipelas.

Quinine in ague and malaria.

Salicin } For the pain caused by rheumatic fever
Salicylate of soda } and influenza.

Ipecacuanha in dysentery.

Mercury in the early stages of syphilis.

Iodide of potassium for the later manifestations of syphilis.

To these may be added medicines which destroy worms which inhabit the intestine. Thread-worms are destroyed by aperients and astringent enemata :—

Male-fern for tape-worms.

Santonin for round worms.

CAUTIONS IN ADMINISTERING DRUGS

Opium and preparations which contain it.—Compound ipecacuanha powder (Dover's powder), chlorodyne, and compound tincture of camphor (paregoric) must be given with great caution to young children and to old people with bronchitis. They should not be given at all to people suffering from kidney disease with scanty secretion of urine. *Symptoms of poisoning.*—Drowsiness or deep sleep; if aroused, a dull, heavy look. Pupils contracted, and do not dilate on shading the eyes from the light. *Treatment.*—Keep the patient awake, by shouting, pinching, or flicking with a towel. Give sal volatile (not brandy or whisky), and strong black coffee or tea. If unable to swallow, inject coffee into the bowel. Artificial respiration if insensible.

Nux vomica contains the very poisonous substance, *strychnine*. When an overdose has been given there is restlessness, stiffness of the muscles at the back of the neck, twitching of the limbs, and, in severe cases, spasms and convulsions. *Treatment.*—Strong tea, made by boiling the leaves in a saucepan, so as to extract the tannin, and bromide of potassium in large doses.

Antipyrin and **phenacetin** may produce collapse, cold perspirations, difficulty in breathing, dilated pupils, and blueness of the lips. *Treatment*.—Stimulants; warmth; artificial respiration.

Mercury.—‘Calomel,’ ‘blue pill,’ ‘grey powder,’ should not be given to feeble people with wasting or advanced kidney disease. An overdose may cause vomiting and diarrhoea, with severe abdominal pain. *Treatment*.—Eggs beaten up in milk or water in large quantities. Tincture of opium. Warmth. Mercury taken in small doses and continued too long causes the gums to become swollen, profuse flow of saliva, offensive breath, anæmia, and tremors of the limbs. When given to infants too frequently the enamel of the permanent teeth may be destroyed. All ‘teething powders’ contain mercury, and are the cause of many spoilt teeth.

Colchicum should only be given to robust persons with acute gout. It may cause much depression with profuse perspirations, or vomiting and diarrhoea with profuse biliary evacuations. *Treatment*.—Barley-water or arrowroot in large quantities; warmth and stimulants.

Santonin sometimes causes much irritation of the urinary bladder, with frequent desire to pass water; the urine becomes a bright yellow or red. *Treatment*.—Saline aperients in large quantities of water; barley-water.

Male-fern rarely disagrees, but may cause vomiting and purging. *Treatment*.—Same as for overdose of mercury.

Salicylate of soda often causes ringing or whirring noises, like machinery, in the ears, and more or less deafness; if persisted in, profuse perspirations and great depression may occur. *Treatment*.—Discontinue the drug; give stimulants and tincture of nux vomica if the symptoms are severe.

Potassium preparations, if taken for long together, are far more depressing than those of sodium.

Bismuth and **iron** make the motions a black colour. This is quite harmless.

TABLE OF DOSES

Acid hydrochloric dilute	m5-20	Citrate of lithia . . .	gr. 5-10
„ nitric dilute . . .	m5-20	„ of potash . . .	gr. 20-60
„ nitro-hydrochloric dilute . . .	m5-15	Cloves, infusion . . .	31-32
„ sulphuric dilute . . .	m5-20	Cod-liver oil . . .	31-31
„ tartrate of potash, 'cream of tartar'	gr. 20-60	<i>Colchicum</i> , extract . . .	gr. $\frac{1}{2}$ -2
Æther, spirits of . . .	m20-31	„ wine . . .	m5-20
Aloes, aloin . . .	gr. $\frac{1}{4}$ -4	Colocynth and hyoscyam. pill . . .	gr. 3-10
„ compound decoction . . .	32-31	Compound decoction of aloes . . .	32-31
„ pill aloes and myrrh . . .	gr. 5-10	Compound <i>ipecacuanha</i> powder . . .	gr. 1-10
Alum . . .	gr. 5-15	Compound jalap powder . . .	gr. 20-60
Ammonia—		„ liquorice powder . . .	gr. 20-60
Aromatic spirits . . .	m10-31	Compound rhubarb pill . . .	gr. 2-10
Bromide . . .	gr. 2-15	„ rhubarb powder . . .	gr. 10-31
Carbonate . . .	gr. 1-5	Compound senna mixture . . .	32-31 $\frac{1}{2}$
Liquor amm. acet. . .	31-4	Compound tincture of cardamoms . . .	m20-31
Ammoniated tincture of quinine . . .	m30-31	Confection of pepper . . .	gr. 30-31
Ammoniated tincture of valerian . . .	m10-31	„ of senna . . .	gr. 30-32
<i>Antipyrin</i> . . .	gr. 2-10	'Cream of tartar,' acid tartrate of potash . . .	gr. 20-60
Bicarbonate of potassium . . .	gr. 5-20	Dill water . . .	31-2
Bicarbonate of sodium . . .	gr. 5-30	<i>Dover's powder</i> . . .	gr. 1-10
Bismuth, carbonate . . .	gr. 5-20	Essence of peppermint . . .	m10-20
'Black draught' . . .	32-1 $\frac{1}{2}$	Ether, spirits of . . .	m20-31
'Blue pill' . . .	gr. 3-8	Extract, cascara . . .	gr. 1-4
Bromide of ammonium . . .	gr. 2-15	„ „ liquid . . .	m10-60
„ of potassium . . .	gr. 5-20	„ <i>colchicum</i> . . .	gr. $\frac{1}{2}$ -2
<i>Calomel</i> . . .	gr. $\frac{1}{2}$ -5	„ <i>nux vomica</i> . . .	gr. $\frac{1}{4}$ -1
Calumba, infusion . . .	32-31	„ opium . . .	gr. $\frac{1}{4}$ -1
„ tincture . . .	m10-31	Fluid magnesia . . .	32-32
Camphor, compound tincture . . .	m10-30	Gentian, infusion . . .	32-31
Carbonate, ammonia . . .	gr. 1-5	„ tincture . . .	m10-31
„ bismuth . . .	gr. 5-20	Ginger powder . . .	gr. 10-20
„ magnesia . . .	gr. 10-31	„ syrup . . .	m15-31
Cardamoms, compound tincture . . .	m20-31	„ tincture . . .	m15-31
Carlsbad salt . . .	gr. 20-31	Glycerine . . .	m10-32
Cascara, extract . . .	gr. 1-4	'Grey powder' . . .	gr. 1-8
„ liquid extract . . .	m10-60	Hydrochloric acid dilute . . .	m5-20
Castor oil . . .	m30-31	Infusion of cloves . . .	31-2
Catechu, tincture . . .	m10-31	„ of quassia . . .	32-31
Chalk and mercury, 'grey' powder . . .	gr. 1-8	<i>Ipecacuanha</i> —	
<i>Chlorodyne</i> . . .	m5-15	Powdered . . .	gr. 5-30
Chloroform, spirits of . . .	m5-30	Compound powder . . .	gr. 1-10
Cinnamon water . . .	31-2	Wine, expectorant . . .	m5-30
Citrate of iron and ammonia . . .	gr. 2-10	Wine, emetic . . .	33-6
Citrate of iron and quinine . . .	gr. 2-10	Iron—	
		Citrate of, and ammonia . . .	gr. 2-10
		Citrate of, and quinine . . .	gr. 2-10

Iron—

Reduced . . .	gr. 1-5
Sulphate . . .	gr. $\frac{1}{2}$ -3
Tincture of per- chloride . . .	℥5-30
Wine . . .	℥1-4
Jalap, compound pow- der . . .	gr. 20-60
<i>Laudanum</i> . . .	℥2-15
Lime-water . . .	℥ $\frac{1}{2}$ -4
Liquid extract of cas- cara . . .	℥10-31
Liquid extract of <i>male</i> <i>fern</i> . . .	℥15-30
Liquor ammon. acet. .	℥1-4
Liquorice, compound powder . . .	gr. 20-60
Lithia, citrate . . .	gr. 5-10
Magnesia—	
Carbonate . . .	gr. 10-31
Fluid . . .	℥2-32
Oxide . . .	gr. 10-31
Sulphate . . .	gr. 20-3 $\frac{1}{2}$
<i>Male fern</i> , liquid ex- tract . . .	℥10-30
Mercury—	
'Blue pill' . . .	gr. 3-8
'Calomel' . . .	gr. $\frac{1}{5}$ -5
'Grey powder' . . .	gr. 1-8
Nitrate, potash . . .	gr. 5-20
Nitric acid, dilute . .	℥5-20
Nitro-hydrochloric acid, dilute . . .	℥5-15
<i>Nux vomica</i> —	
Extract . . .	gr. $\frac{1}{4}$ -1
Tincture . . .	℥3-10
Oil, castor . . .	℥1-31
Opium—	
'Chlorodyne' . . .	℥5-15
Compound ipeca- cuanha powder, 'Dover's' . . .	gr. 1-10
Extract . . .	gr. $\frac{1}{4}$ -1
Pill . . .	gr. $\frac{1}{4}$ -1
Tinct. camp. comp., 'Paregoric' . . .	℥5-30
Tincture, ' <i>lauda-</i> <i>num</i> ' . . .	℥2-15
'Paregoric,' tinct. camp. comp. . .	℥5-30
Pepper, confection of .	gr. 30-31
Peppermint essence .	℥10-20
„ water . . .	℥1-2
Perchloride of iron tinc- ture . . .	℥5-30
<i>Phenacetin</i> . . .	gr. 2-10
Pills, aloe and myrrh .	gr. 2-10
„ 'blue' . . .	gr. 3-8
„ colocynth and hy- oseyam. . .	gr. 3-10

Pills, compound rhu-

barb . . .	gr. 2-10
„ opium . . .	gr. $\frac{1}{4}$ -1
Potassium—	
Acid tartrate, cream of tartar . . .	gr. 20-60
Bicarbonate . . .	gr. 5-20
Bromide . . .	gr. 5-20
Citrate . . .	gr. 20-60
Nitrate . . .	gr. 5-20
Powder—	
<i>Ipecacuanha</i> . . .	gr. 15-30
<i>Ipecacuanha</i> com- pound, 'Dover's' .	gr. 1-10
Ginger . . .	gr. 5-20
'Grey' . . .	gr. 1-8
Jalap compound . .	gr. 20-60
Liquorice com- pound . . .	gr. 20-60
<i>Mercury and chalk</i> , 'grey' . . .	gr. 1-8
Rhubarb . . .	gr. 5-20
Compound rhubarb .	gr. 10-31
Quassia, infusion . .	℥2-31
„ tincture . . .	℥10-31
Quinine, sulphate . .	gr. 1-10
„ ammoniated tincture . . .	℥30-31
„ citrate of iron and quinine. . .	gr. 2-10
„ 'Warburg's' tincture . . .	℥1-4
Rhubarb, powdered .	gr. 5-20
„ compound pill .	gr. 2-10
„ „ powder . .	gr. 10-31
„ syrup . . .	℥1-34
„ tincture . . .	℥1-31
Sal volatile . . .	℥10-31
Salicine . . .	gr. 1-10
<i>Salicylate of soda</i> .	gr. 5-20
Salt, Carlsbad . . .	gr. 20-31
<i>Santonin</i> . . .	gr. $\frac{1}{5}$ -5
Senega tincture . . .	℥20-31
Senna—	
Compound mixture .	℥ $\frac{1}{2}$ -31 $\frac{1}{2}$
Confection . . .	gr. 30-32
Sodium bicarbonate .	gr. 5-30
„ <i>salicylate</i> . . .	gr. 5-20
„ sulphate . . .	℥1-31
Spirits of æther . . .	℥10-31
„ aromatic of am- monia . . .	℥10-31
„ chloroform . . .	℥5-30
Squills, tincture . . .	℥10-25
Sulphate, iron . . .	gr. $\frac{1}{4}$ -3
„ magnesia . . .	gr. 20-3 $\frac{1}{2}$
„ quinine . . .	gr. 1-10
„ soda . . .	℥1-31
„ zinc, emetic . . .	gr. 15-30
Sulphuric acid, dilute .	℥5-20

Syrup of ginger . . .	m15-31	Tincture, senega . . .	m20-31
„ of rhubarb . . .	31-4	„ squills . . .	m10-25
„ of tolu . . .	m10-30	„ tolu . . .	m15-31
<i>Tinct. camp. comp.</i> , ‘Paregoric’ . . .	m3-30	„ valerian, am- moniated . . .	m10-31
Tincture, calumba . . .	m10-31	„ ‘Warburg’s’ . . .	31-4
„ cardamoms, compound . . .	m20-31	Valerian, ammoniated tincture . . .	m10-31
„ catechu . . .	m10-31	‘Warburg’s fever’ tinc- ture . . .	31-4
„ gentian, com- pound . . .	m10-31	Water, cinnamon . . .	31-2
„ ginger . . .	m10-31	„ dill . . .	31-2
„ <i>nux vomica</i> . . .	m2-10	„ lime . . .	3½-4
„ <i>opium, lauda-</i> <i>num</i> . . .	m2-15	„ peppermint . . .	31-2
„ perchloride of iron . . .	m5-30	Wine, <i>colchicum</i> . . .	m5-20
„ quassia . . .	m10-31	„ ipecacuanha, ex- pectorant . . .	m5-30
„ quinine, am- moniated . . .	m30-31	„ ipecacuanha, eme- tic . . .	33-6
„ rhubarb . . .	31-31	„ iron . . .	31-4
		Zinc, sulphate, emetic . . .	gr. 10-30

Enemas or clysters are used for several purposes. (1) To clear the lower bowels. (2) To allay irritation of the lower bowel by washing the mucous membrane of the intestine either with bland fluids, such as starch emulsion or barley-water, or with boracic solution. (3) Astringent, to check bleeding and destroy thread-worms. (4) To administer nutriment.

Enemas may be administered by means of a ball syringe, a Higginson’s syringe, or a douche-can. Whatever instrument is used, the nozzle should be well oiled before insertion, and no force must be used in injecting the fluid, which should flow in slowly; it will generally be found advisable to make short pauses every quarter of a minute by ceasing to compress the ball of a Higginson’s syringe or by squeezing the tube of a douche-can. The patient must resist the impulse to return the injection which is usually felt at first, and the process may then be continued. The patient may lie on his back or left side, with a sheet or towel folded several times under the buttocks, and when able he should insert the nozzle himself. When done by another person it must be directed upwards, and then with an inclination backwards. After the fluid has been introduced, the buttocks should be compressed together as the nozzle is withdrawn. The longer the injection can be retained, the more effectual it will prove. The following enemas are those in most common use; the method of preparing them is stated in the Appendix:—

1. *Purgative enemas*.—Glycerine ; soap and water ; olive oil ; castor oil ; turpentine.

2. *Soothing enemas*.—Starch mucilage ; opium and starch ; boracic lotion.

3. *Astringent enemas*.—Salt and water ; turpentine ; tannic acid ; infusion of quassia.

4. *Nutritive enemas* and their preparation are described in the chapter on FEEDING THE SICK.

Suppositories are used for introducing drugs in a solid form into the bowel. They are conical-shaped bodies, usually made of some solid vegetable oil, such as oil of theobroma, which has a low melting point, as a vehicle for the drug. They should be smeared with vaseline, and then rapidly inserted and pushed well up into the bowel. The suppositories in common use are :—

1. *Aperient*, made of glycerine ; useful in ordinary constipation.

2. *Soothing*.—Opium and lead ; belladonna.

3. *Astringent*.—Opium and lead ; tannic acid, and cubebs, useful for internal piles and relaxed conditions of the mucous membrane of the bowel.

Lozenges are pellets so made as to dissolve slowly in the mouth.

1. *Soothing and expectorant* : four or five may be taken daily.—Ipecacuanha, quarter grain ; chlorate of potash, five grains ; chloride of ammonium, three grains.

2. *Astringent* : one may be taken every three hours.—Catechu, one grain ; tannic acid, half a grain.

3. *Stomachic and antacid*.—Bismuth, two grains ; ‘soda mint tabloids,’ one to two, after meals.

Gargles, mouth washes, and throat sprays are used to cleanse the mouth and throat, without being swallowed. Gargles are rarely advisable in people with acute inflammation of the throat, as the exertion in gargling is painful and often aggravates the condition. Young children can rarely be made to gargle. For them and for adults with inflamed throats the spray is to be preferred ; the tongue must be kept depressed

with the handle of a spoon or spatula, so that the application reaches the back of the mouth.

1. *Antiseptic*.—Boracic acid ; permanganate of potash, ‘Condy’s’ ; chlorine solution.

2. *Soothing and mildly antiseptic*.—Chlorate of potash.

3. *Astringent*.—Alum ; tannic acid ; tincture of perchloride of iron.

Inhalations are used in affections of the respiratory passages. They are either diffused about the room by means of a steam-kettle or directly inhaled. Many complicated inhalers are sold, but an ordinary wide-mouthed jug usually serves the purpose. When a feeble patient is sitting up, using an inhaler, someone must remain constantly by the bedside and steady the vessel containing the hot water ; patients often drop off to sleep and sometimes become faint whilst inhaling.

1. *Soothing and expectorant*.—Compound tincture of benzoin ; eucalyptus oil.

2. *Astringent*.—Spirits of turpentine.

One teaspoonful of the fluid to be added to a pint of hot water at a temperature of 140° F. Boiling water should not be used.

CHAPTER V

TREATMENT OF DISEASE BY EXTERNAL APPLICATIONS

Heat: hot baths; packs; fomentations; poultices; dry heat—Cold: cold baths and packs—Massage—Counter-irritation: heat; liniments; mustard; paints; dry cupping and leeches—Sedative applications: cocaine; menthol; belladonna—Surgical Appliances: instruments; bandages; strapping; splints; slings.

METHODS OF APPLYING HEAT AND COLD

Heat

WHEN the bodily temperature falls below the normal point, 98.4° , in shock from injury or collapse during disease, as in severe diarrhoea or pneumonia, heat may be supplied by various methods. Pain may also be relieved by the local application of heat.

1. **The hot bath.**—This should be a large bath, so that the patient can lie full length, prepared in a warm room. The water should be at a temperature of 100° when the patient first enters it, and gradually increased up to 105° or as hot as he can bear it by adding fresh supplies of hot water. Whilst he is in the bath his temperature should be taken from time to time by means of a thermometer in the mouth, and he may be removed when it rises to normal. The usual time required is about half an hour.

2. **The mustard bath** is an excellent stimulant for children suffering from collapse. Two tablespoonfuls of mustard are required for every gallon of water in the bath. The mustard should first be made into a paste in a basin and then gradually added to the water in the bath. Temperature, 100° .

3. **Hot packs** are useful in cases of acute inflammation of the kidneys, and when baths cannot be obtained or there are not sufficient helpers. The bed is protected with a mackintosh

and a blanket laid over it. The patient is then stripped and a blanket dipped in hot water and wrung out as dry as possible thrown over him, with plenty of blankets over all. Warm milk or barley-water may be given to promote perspiration. After an interval of half an hour the wet blanket may be renewed, or it may be removed and the patient rapidly enveloped in hot dry blankets.

4. Wrapping the patient in hot blankets, giving him warm fluids to drink, and placing hot-water bottles or heated bricks well wrapped up to prevent burning, in the bed, is a ready method of promoting perspiration.

Local applications of heat:—

1. **Hot fomentations.**—Flannel, spongio-piline, or “gamgee-tissue” may be wrung out in boiling water in the following way. The material is wrapped up in a towel folded lengthwise and placed in a basin, the ends of the towel hanging over the edge. Boiling water is then poured into the basin, and the dry ends of the towel then seized and twisted in reverse ways so as to wring out the water. The towel is then untwisted and the fomentation (care being taken that it is not too hot) laid on the part, covered with oiled silk, then a layer of cotton wool, and secured with a flannel bandage. They may be sprinkled with half a teaspoonful of laudanum or turpentine before being laid on the part, according to whether it is desired to relieve pain or cause counter-irritation.

2. **Poultices** are now comparatively rarely used. They are heavy and messy applications, much inferior to fomentations, and should never be used for infants with chest affections, as they embarrass the breathing.

Linseed-meal poultice.—Pour boiling water into a basin which has been previously warmed, and sprinkle in the meal, stirring constantly with a broad-bladed knife, until a thick paste is formed. Spread the paste on a piece of linen or a layer of tow and turn in the edges all round. A piece of fine muslin dipped in olive oil may be laid over the paste to prevent it sticking to the skin. Secure it to the part with a flannel bandage, and change every three or four hours.

Bran poultices are lighter than linseed, and can be used

several times. Make a flannel bag the size required and fill it with bran. Wrap it loosely in a towel, pour boiling water on, and wring out as in making a fomentation.

Mustard poultices.—These are made of a combination of mustard, one part, and linseed meal, four parts; this proportion is quite strong enough. First mix the mustard with *warm* water in a separate vessel; then mix the linseed meal with boiling water as in making a simple linseed poultice. Finally add the mustard mixture, and stir it with the meal; spread it on linen, and apply it for three or four hours.

3. **Dry heat.**—Wool may be heated against a can containing boiling water and laid on affected parts. This is a most useful way of applying heat in inflammations of the eye and joints. Heating wool in front of a fire is dangerous, as it is liable to become ignited when being heated. In inflammations of the chest, a jacket may be made by cutting holes for the arms in a sheet of “gamgee-tissue,” and pinning it up where it overlaps down the front of the chest. Two or more of these jackets should be made, and changed every twelve hours. The jacket that has been removed may be dried over the back of a chair at a safe distance from the fire, and warmed against a hot-water can before being put on again. A layer of dry hot wool wrapped round a joint, and covered with oiled-silk, rapidly becomes saturated with perspiration, and gives great relief in acute inflammation, such as gout and rheumatism. It is in reality a combination of dry heat and a fomentation, the moisture being supplied by the patient. The wool should be changed frequently.

Cold

Cold baths and packs are used to lower the temperature in fever, and local applications of cold to check inflammation.

1. **Cold sponging** is the readiest method of reducing temperature. The bed is protected in the same way as for hot packs, and the patient is stripped, and the face, trunk, and limbs freely sponged for five or ten minutes. The water should be tepid (90° F.) at first, but gradually cooled by adding cold water.

2. **Cold packs.**—The bed prepared as above. The patient is stripped, and a sheet wrung out in cold water laid over him, and covered with another dry sheet. The temperature should be taken in the mouth, and if it continue high after a quarter of an hour, the sheet should be wrung out again and reapplied. If the patient falls asleep, a blanket should be laid over the sheet, and he may be left undisturbed for an hour. Cold packs can be safely used in all acute cases of high temperature, whatever the cause may be, except in diphtheria accompanied by great prostration. In pneumonia the wet sheet should only be laid across the chest.

3. **The cold bath** is quite the most efficient method, but should only be used under medical supervision. The patient must be lifted in and out of the bath, and on no account be allowed to help himself. Two strong assistants are indispensable, if the patient is an adult, to lower him enveloped in a sheet into the bath, where he should be made as comfortable as possible with a water-cushion or some form of pillow, placed under his head. The bath should be placed by the side of the bed, and filled and emptied there, whenever possible. The water should at first be at a temperature of 100° F., and rapidly cooled down by adding cold water poured in at the head of the bath until it falls to 80° or 70°, according to the condition of the patient. He should then be lifted out, rubbed dry, and covered with a blanket. The bath may be repeated several times in the twenty-four hours, but the patient requires to be carefully watched, as sudden collapse has been occasionally, though very rarely, noticed to occur. This treatment is particularly useful in the high temperatures attending enteric and rheumatic fever, and is far safer than attempting to reduce temperature by means of drugs.

The methods of applying *cold locally* are described in the treatment of **contusions**.

MASSAGE

External manipulations of the body may be found useful:

- (1) to soothe the nervous system ; (2) to help the circulation ;
- (3) to aid the nutrition of diseased or disused organs ; (4) to

stimulate the movements of the intestine; (5) to hasten the absorption of blood-clot and inflammatory exudations; (6) to prevent joints from becoming stiff, or to restore movement after injury or enforced disuse.

The movements most often used are *stroking* and *kneading*, and in performing them the skin should not be chafed, but the underlying structures influenced by steady but gentle pressure.

Stroking is practised by grasping the limb between the hands, and gliding them upwards in opposite directions in a series of short spiral strokes until the trunk is reached. This must obviously help the flow of the fluids contained in the veins and lymphatic vessels. Gentle stroking movements are soothing, and tend to induce sleep.

Kneading consists of compressing and rolling the muscles between the fingers, or by pressing the skin firmly with the palm of the hand, and rolling it over the underlying structures. In kneading the abdomen, the movements should be commenced in the ileo-cæcal region (see fig. 11), and carried upwards, then across the abdomen to the left, and finally down the left side so as to follow the course of the large intestine. Douching with hot water materially assists massage in promoting absorption of inflammatory exudation.

COUNTER-IRRITATION

When an organ is inflamed, the symptoms can often be relieved by producing a similar condition in the overlying or neighbouring skin. To effect this, in some cases, it is necessary to produce blistering, but mere reddening of the skin is usually sufficient. Counter-irritation amounting to reddening may be produced by:—

- | | | | |
|--|---|---|------------------------|
| 1. The application of heat | . | . | { Hot-water bottles. |
| | | | { Poultices. |
| | | | { Hot fomentations. |
| 2. Friction with stimulating liniments | | | { Camphor liniment. |
| | | | { Turpentine liniment. |
| | | | { Poultices. |
| 3. Mustard | . | . | { Plasters. |
| | | | { Leaves. |

4. Paints applied with a brush—tincture of iodine and liniment of iodine. The latter is by far the stronger, and should be called a paint rather than a liniment, as it is altogether unsuitable for rubbing on a part.

The most active methods of causing counter-irritation are cupping and the application of leeches, but these should only be used under medical advice.

Dry cupping is most often applied to the chest, loins, or abdomen, and may be performed in the following way. The skin is washed with hot water, and briskly rubbed. A small piece of blotting-paper dipped in methylated spirit is then placed in a small tumbler, and ignited. Before the flame dies out, the tumbler is inverted, and firmly pressed on the spot selected, when the flame is immediately extinguished; and as the glass cools the skin is sucked up, forming a rounded swelling in the glass.

Leeches are often troublesome to induce to bite. Wash the skin, and moisten it with milk, or prick the skin with a clean needle so as to draw a drop of blood. Place the leech in a small glass, and invert it over the part. Leeches should be allowed to drop off, or be compelled to do so by sprinkling a little salt on them. They should never be pulled off. The bleeding usually quickly ceases, but if it continue, a pledget of wool should be placed on the bite, and gentle but steady pressure kept up with the finger directly on the spot. This may become tedious, but will be effectual if persevered with. After the bleeding has ceased, leech-bites should be inspected from time to time for the first few hours, as it sometimes begins again. If the finger is only kept patiently on the bite, no possible harm can follow.

SEDATIVE APPLICATIONS

These are used to relieve pain, and are most useful in neuralgia and inflammation of the skin and superficial structures. They are practically useless when a deep-seated organ is affected, and under such circumstances are far less effectual than counter-irritants.

1. *Cocaine* in solution is much used by surgeons to produce

local loss of sensation for small operations. It has but little effect if painted on the skin, but mucous membranes and the surfaces of wounds and ulcers become temporarily quite insensitve when painted with it. It must be used with caution, as it sometimes causes collapse attended with most distressing breathlessness, and fatal results from its use have been recorded. Young and vigorous persons appear to suffer from its ill effects quite as often as feeble individuals. If faintness due to its use occurs, the patient should be treated as for ordinary fainting—laid flat on his back, and given sal-volatile or brandy. Cocaine is expensive, and its solutions do not keep well, so it is best ordered in small quantities.

Cocaine (6 grains) dissolved in camphor water, \mathfrak{m} 120 (5 per cent.) is quite strong enough for most purposes, and not more than \mathfrak{m} 15 should be used in one application.

A preparation termed ‘eucaine’ has been recently made, which is said to be almost free from the poisonous properties of cocaine; it has been in use for so short a time that no dogmatic opinion as to its merits is offered here.

2. *Menthol* exerts a definite influence on both the skin and mucous membrane, though not nearly to such a marked degree as cocaine on the latter. Its use, however, is quite free from risk, and it is most useful in neuralgia, and in catarrhal conditions of the mucous membrane of the nose and throat. It may be used in the form of (1) menthol crystals or pencils; (2) menthol snuff; (3) menthol liniment; (4) solutions in water and parolein for spraying.

3. *Belladonna* is constantly mentioned in this book in the treatment of painful inflammations. *Atropine*, derived from it, is invaluable for certain affections of the eye, but its indiscriminate use is most harmful. *Belladonna* is used externally in the form of (1) liniment; (2) paint; (3) plaster.

SURGICAL APPLIANCES

Instruments.—The following list of instruments comprises all that are necessary for the dressing of wounds, and may be obtained at any surgical instrument maker’s. It would be well if they were kept in all houses remote from towns, and should

form part of the equipment of every yachting or shooting expedition.

1. *Scissors*.—One pair with rounded points, and a second smaller pair with one point sharp the other rounded. The first are useful for cutting dressings and general purposes, the second for snipping blisters, removing dead skin, and dividing sutures and ligatures.

2. *Spring forceps*, or tweezers with fine roughened points, known as ‘splinter-forceps,’ are most useful for removing thorns, stings of insects, and picking out grit from a wound. They are also used for steadying the edge of a wound when sutures are being inserted (fig. 21).

3. *Artery forceps* with a catch on the shafts (fig. 22, Spencer Wells pattern). On closing them the blades are kept shut by the



FIG. 21.—SPRING FORCEPS.

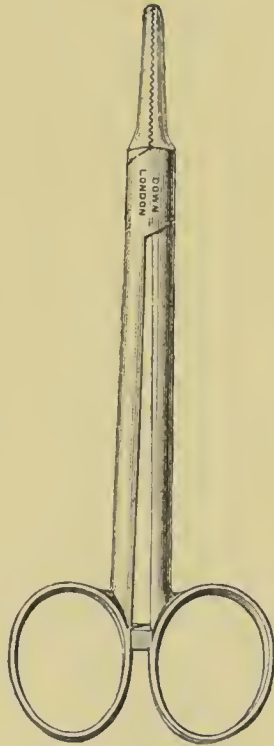


FIG. 22.—ARTERY FORCEPS.

catch until liberated by making lateral pressure with the finger and thumb in the bows. They are intended to grasp the cut end of a divided artery, and close it by pressure until the vessel is tied, when they may be removed; but they are also useful for removing dressings from a wound which it is undesirable that the fingers should come in contact with.

4. A *probe* is a flexible piece of copper wire with a bulbous end, coated with silver. A surgeon uses it for a variety of purposes, such as in searching for foreign bodies and exploring the extent of a wound. In unskilled hands it may be used for separating the edges of an inflamed wound, and for gently removing small dressings. Other uses are frequently indicated in this work.

5. *Needles* for suturing wounds are made in a variety of patterns and sizes. Straight needles with triangular points and half-curved needles are most generally useful.

6. *Sutures* of silk or catgut on reels, and strands of horse-hair.

7. A *caustic-case* containing a stick of nitrate of silver (lunar caustic), the end rubbed into a fine point on a piece of moistened rag. Used for stimulating unhealthy granulations, cracks, and fissures, and destroying small warts.

8. A *spatula* with a broad, blunt-edged, metal blade, shaped like a paper-knife, for depressing the tongue in examining the throat, or for mixing ointments.

9. Boxes of *safety-pins* of various sizes.

10. A *Higginson's syringe*, or a *douche-can*.

In addition to the above, no expedition should be without a surgeon's abscess-knife and a catheter.

11. The *knife* may be wanted for opening superficial abscesses, such as whitlows and abscesses of the gums. Fig. 23 shows a knife with four blades suitable for a variety of purposes.

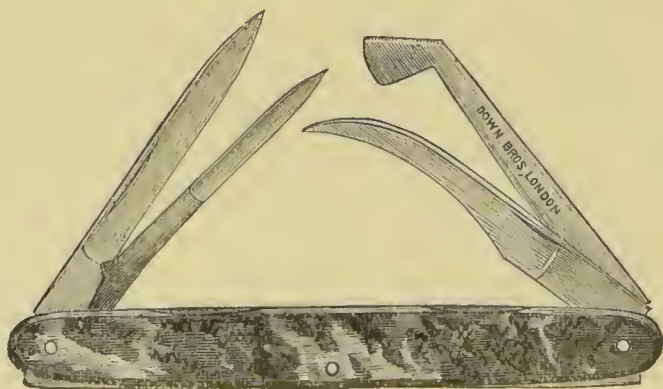


FIG. 23.—ABSCESS-KNIFE, GUM-LANCET, &C.

12. A *catheter* is often required for drawing off the urine an unconscious patient, or relieving the retention which so often follows the shock of an accident or operation. The most useful

form for general purposes is a No. 8 'silk-webbed, flexible, gum-elastic, cylindrical catheter.' They are usually sold with a stiff wire stylet, but when used by an unskilled person this stylet must be withdrawn, and the catheter placed in clean *warm*, not hot, water or boracic solution until it is quite flexible. It should then be lubricated with boracic ointment, vaseline, or carbolic oil, and inserted into the urinary orifice and passed with gentle, steady pressure. If the catheter meets with some obstruction, no force must be used, but it should be gently withdrawn about half an inch, and then once more passed forward. Many attempts may have to be made before it is successfully passed, and the urine begins to flow away, but gentleness and patience will probably be rewarded if the urethra has not been previously diseased, and no harm can be done if the catheter is not too stiff, is perfectly clean, and gently used. After the urine has ceased to flow, withdraw the catheter slowly, and thoroughly cleanse it by first wiping off any greasy matter that may adhere to it, then let a stream of clean water flow through it, and finally dip it in boracic solution, and allow it to dry in a free current of air before putting it away.

It is hardly necessary to add that no unskilled person should open an abscess or pass a catheter unless it is impossible to get the help of a surgeon.

Bandages.—Bandages are required for a variety of purposes—retaining dressings on wounds, splints on injured joints or broken bones, and to give support to any part. The art of applying them efficiently is soon learned; to apply them neatly requires much practice.

Handkerchief bandages.—A large square handkerchief may be used in a variety of ways, and can usually be obtained. Professor Esmarch introduced the use of a triangular bandage, which can be imitated by folding a square handkerchief diagonally, for rendering prompt aid in cases of emergency. The uses of this bandage have been elaborated by the St. John's Ambulance Association, which now supplies them with illustrations stamped on the calico, and printed instructions.¹ It requires but little practice to fold it in a variety of ways for different purposes,

¹ Can be had from the Hon. Director of Stores, St. John's Gate, Clerkenwell, London, E.C., with printed instructions. Price 8d. each, post free.

but without the printed instructions they are not easy to remember.

Roller bandages consist of strips of material of various widths, six yards in length, rolled up tightly. They may be made of calico, linen, or flannel, but what are called 'open-wove' bandages are preferable to any other kind. These bandages should be applied evenly so as to make equable pressure, and on no account cause constriction of the limb at any point, especially above the seat of injury. If a roller is too broad, it is impossible to make it sit evenly; the following are the proper breadths:—

2 inches for the hand, forearm, foot, and head.

2½ inches for the upper arm and leg.

3 inches for the thigh and groin.

In bandaging the limbs a turn should be taken round the wrist or ankle, then two or more turns round the hand or foot,



FIG. 24.—ROLLER BANDAGE APPLIED WITH REVERSES.

and then the bandage should be wound in a spiral up the limb, each turn slightly overlapping the lower one. To make the bandage lie evenly when a limb increases in size, as the leg does at the calf, instead of being simply wound round, it must be folded down on itself by turning the bandage over, so that the upper edge becomes the lower, making what is called a 'reverse,' and this must be repeated at every turn the bandage makes round the limb until the increase in size ceases (fig. 24). It may then be again simply rolled round and fastened off at the top by being stitched or pinned.

The great art is to make it sit evenly, to press gently, and to

remain on. To do this the same gentle steady pull must be maintained as the bandage is rolled round and passed from one hand to the other at the back of the limb. The common mistake is to wind the bandage loosely round the back, and endeavour to tighten it with a jerk as it reaches the front of the limb.

The method of applying what is known as a '*spica*' bandage to the groin is shown in the illustration, fig. 25. For bandaging the chest, a broad roller, five or six inches wide, is simply wound round and kept from slipping down by sewing on

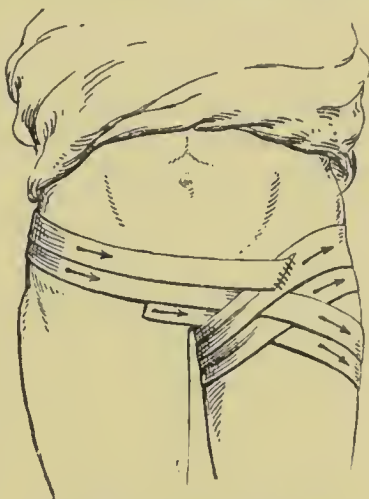


FIG. 25.—SPICA BANDAGE.

two narrow strips of flannel which pass over the shoulders like braces.

For bandaging fingers one yard of tape half-inch wide is useful.

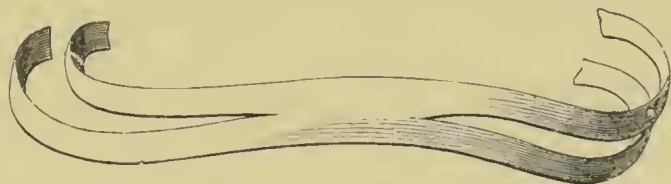


FIG. 26.—FOUR TAILED BANDAGE.

Many-tailed bandages. The 'four-tailed' bandage (fig. 26) is useful for applying a dressing to many parts of the body, and



FIG. 27.—BANDAGE FOR FOREHEAD.
Length, 30 inches. Width, 3 inches.



FIG. 28.—BANDAGE FOR TOP OF HEAD.
Length, 40 inches. Width, 3 or 4 inches.

the various methods may be readily understood by referring to

figures 26–35. It is obviously inferior to a roller bandage, as it gives no support to a limb, but it requires very little skill

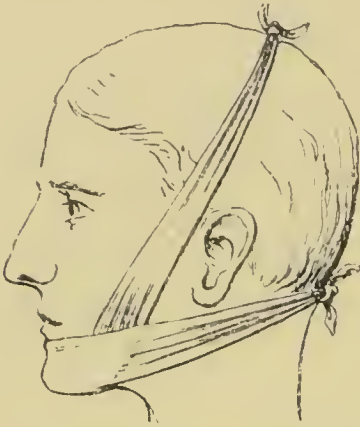


FIG. 29.—BANDAGE FOR LOWER JAW.

Length, 37 inches. Width, 3½ inches.

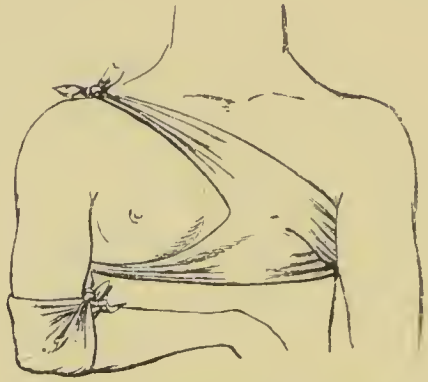


FIG. 30.—BREAST AND ELBOW BANDAGES.

Breast bandage.—Length, 50 inches.
Width, 6 inches.
Elbow bandage.—Length, 15 inches.
Width, 6 inches.

to apply it efficiently. Support may be given to a larger area by splitting a broad piece of calico as in fig. 36, and applying it as in fig. 37. For supporting, and applying hot fomentations to the abdomen, a many-tailed flannel bandage, made on exactly the



FIG. 31.—BANDAGE FOR EYE OR CHEEK.

Length, 30 inches. Width, 3 inches.

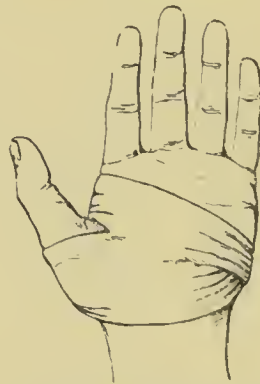


FIG. 32.—HAND BANDAGE.

Length, 12 inches. Width, 2½ inches.

same principles, is most useful, as the bandage can be undone and the fomentation changed without disturbing the patient.

Adhesive plaster, or strapping, is used for bringing the cut edges of wounds together, supporting sprained joints or muscles, and keeping injured parts at rest. Mead's 'rubber-plaster' is most suitable for wounds (see Treatment of Wounds),

but it adheres very firmly, and causes so much pain when being removed from a large surface of skin, that it is better to use

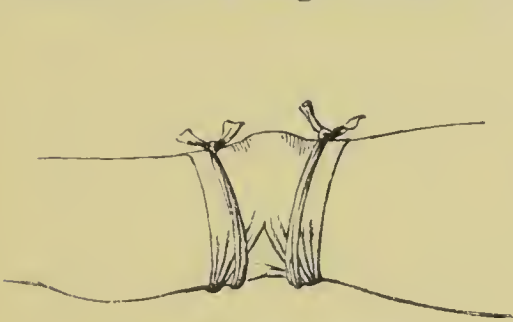


FIG. 33.—KNEE BANDAGE.

Length, 36 inches. Width, 6 inches.



FIG. 34.—BANDAGE FOR HEEL.

Length, 15 inches. Width, 6 inches.

Leicester strapping for supporting joints and similar purposes. It may be applied either in strips encircling the parts, or cut

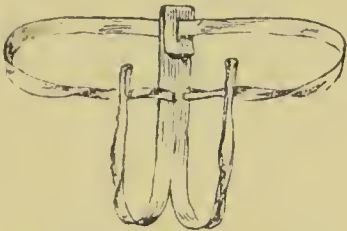


FIG. 35.—T-BANDAGE FOR GROIN OR SEAT.

Girdle, 40 inches, passed round hips and fastened in front. Tail-piece, 36 inches, attached to girdle behind, passed between the legs, and fastened to girdle in front.

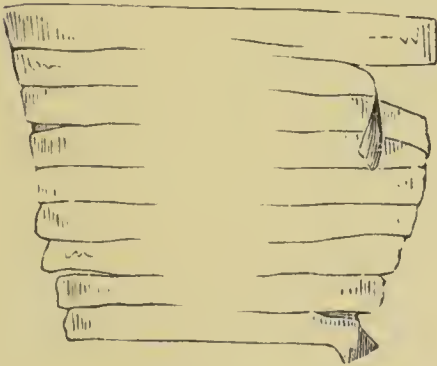


FIG. 36.—MANY-TAILED BANDAGE.

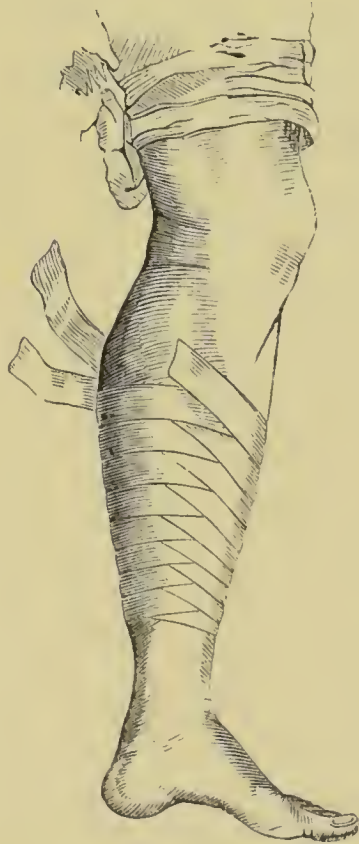


FIG. 37.—MANY-TAILED BANDAGE APPLIED.

after the fashion of a many-tailed bandage. It is obvious that ‘reverses’ must not be made with strapping, as is done with a roller bandage.

Splints are used to keep injured or inflamed parts at rest, and to render a fractured limb immovable and allow the bones to unite.

There are innumerable things which will serve the purpose for temporary splints: sticks, laths, broom-handles, cardboard, rolled-up newspapers, reeds and wheat-straw rolled up tightly in a cloth.

A light and very comfortable splint may be made in the following way:—The part is first wrapped up in cotton wool, and a roller bandage evenly applied. Make some common paste of flour and water, or, what is still better, a mixture of plaster of Paris and water,¹ and rub it into the bandage in a broad streak on each side of the limb, leaving only two narrow unsoaked intervals between them. When it has dried, if we wish to inspect the part, the bandage may be cut with scissors or a sharp knife along one of the intervals between the streaks of plaster, and the splint opened up without being destroyed, the other unstiffened interval acting as a hinge. If necessary the splint may be closed again, and a fresh roller applied over it. Paste takes some hours to dry, but the plaster of Paris mixture sets in a few minutes.

Whatever form of splint is used it must be well padded, especially opposite the injured part, and where it rests on any bony point. If this is not done the skin compressed between the bone and the splint will become inflamed and ulcerate, forming a ‘splint sore.’ When this is taking place there is considerable pain for the first three days if the patient’s complaints are not attended to; he then begins to feel more comfortable, because the skin is dying and the nerve endings are destroyed, and finally, when the splint is removed, though free from pain, the sore is found, which may seriously interfere with his future treatment. It requires two people to apply splints; one holds the limb firmly and steadily with the splints in position, whilst the other bandages or knots handkerchiefs round to keep them in position. Holding the limb properly is more difficult and important than the bandaging, and the more skilled person should devote himself to this task; when once the splints are fairly

¹ One pound of plaster of Paris dusted into a basin containing rather less than a pint of water makes a paste of the consistency of cream, and takes about five minutes to set.

secured he can change places with the bandager and make any alterations that may be necessary.

Slings.—The most comfortable form of sling for the arm is a piece of linen or calico about three feet square, folded diagonally into a triangle. Place one end, A, over the shoulder of the uninjured side, and bring the point of the triangle B well behind the elbow of the arm to be slung. Bend the forearm across the chest, the hand a little higher than the elbow. Bring up the end C in front of the arm over the shoulder of the injured side, and knot it with A at the side of the neck. Finally bring the point B round and pin it to the front of the sling (fig. 38).

Leg sling.—It is sometimes advisable to let a man get about on one leg, whilst the other is kept off the ground. A long

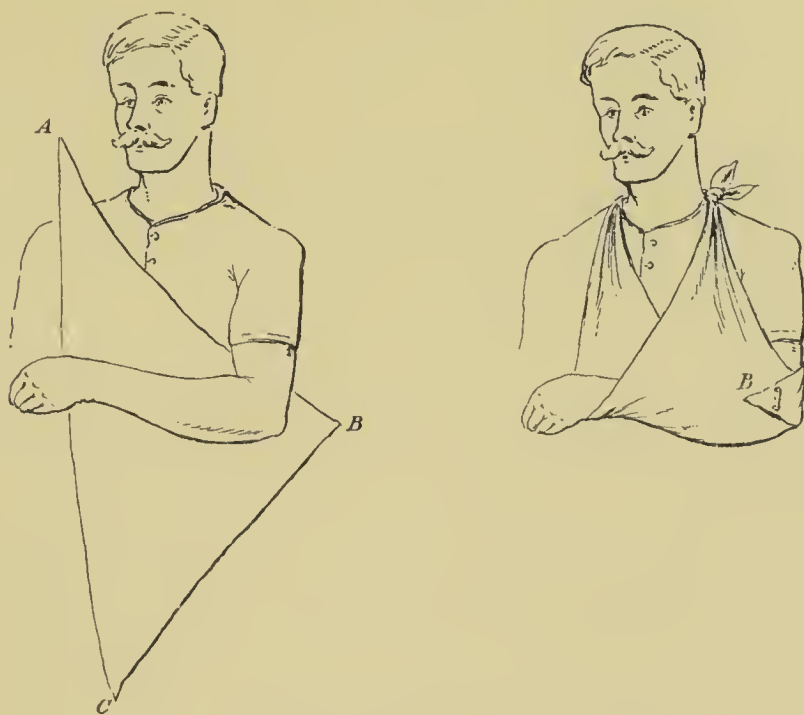


FIG. 38.—ARM SLING.

sling is made of a strip of calico passing round the neck, and receiving the foot of the injured limb like a stirrup, and he then walks with the aid of crutches. A better way is to have an iron patten screwed on to the boot of the sound limb, about three inches high; he then walks with crutches, supporting himself on the patten, the foot of the injured limb being clear of the ground.

CHAPTER VI

TREATMENT OF FEVER AND CONVALESCENCE

General Description of Treatment—Feeding during Fever—
Management and Treatment of Convalescence.

THE TREATMENT OF FEVER

A GENERAL description of the treatment of fever is here given to avoid reiteration when dealing with the special varieties of fever.

When a patient is first taken ill and found to be feverish, it is usually impossible at first to ascertain definitely what the disease is, or whether it is infectious. In times of epidemics of such diseases as influenza and scarlet fever, or if the patient has been recently in contact with a case of infectious illness, we have some clue as to what disease we probably have to deal with, but it must be mere conjecture until the characteristic symptoms have actually developed. Therefore, in all cases the precaution should be taken of isolating the patient as completely as possible from other inmates of the house who are likely to contract the disease, particularly children. It is no hardship to the patient to be left in charge of one person to nurse him, as he usually longs for quiet and does not wish to be talked to or disturbed. If he is obviously very ill, it is as well to consider from the first who can nurse him during the day, and what arrangements can be made for the night. It is not uncommon for anxious relatives to vie with one another in their attention to the invalid both day and night, with the result that they all become equally exhausted after a few days. Proper periods for work, meals, rest and outdoor exercise should be arranged. The nurse who takes charge at night should take a walk in the morning, retire to rest at midday, and be aroused in the evening alert and fit for the night's work. She should receive the report of the day's progress and any instructions

from the day nurse, and then see that everything she is likely to want for the patient during the night is in readiness, before the other members of the household retire to rest.

The arrangement of the sick-room has already been described. In spite of the labour involved in thoroughly clearing a room, it should always be done immediately if there is any ground for suspicion that the disease is infectious, and the patient removed to it as soon as it has been warmed and the bed prepared. If this is done promptly, much expense and trouble will be saved ultimately if the disease proves to be infectious, and if it proves not to be so, the relief from the inconvenience which such cases always entail in a household will compensate for any trouble which has fortunately proved unnecessary. Children should not be thoughtlessly removed from the house and sent elsewhere. Remember that they may be already infected and subsequently develop the disease and infect other households. They should be rigidly excluded from any contact with the attendants on the patient, and kept under observation until the period necessary for the development of the disease has elapsed.

The treatment of the patient must be conducted on the following lines :—

1. Rest and quiet.
2. Fresh air without draught, at an even temperature.
3. Suitable food.
4. Cleanliness.
5. Regulating the action of the skin, bowels, and kidneys.
6. Relief of pain.
7. Reduction of bodily temperature if it rises to a dangerous point.
8. The administration of stimulants if there are signs of heart failure or general weakness.

If at the onset of the illness the patient feels cold, the face and lips look pale, and the pulse is small and hard, perspiration should be induced by giving hot drinks containing small quantities of sal volatile or spirits, and he may be given a hot bath, or wrapped up in blankets with hot-water bottles placed in the bed.

If the face is flushed, the skin hot and dry, and the pulse

rapid, hard, and large, stimulants are best avoided and perspiration induced by warm drinks, such as lemonade or barley-water. A simple diaphoretic (see Appendix, *Prescription I.*) may be given, but as a rule the less medicine given in the treatment of fever the better.

Constipation may be relieved by a mild aperient, such as small doses of castor oil or a saline given in the early morning.

If there is pain and tenderness of the *abdomen* every form of aperient should be *avoided*, and constipation relieved by soap-and-water enemas.

Thirst may be relieved, and the action of the skin and kidneys promoted, by a free supply of cold water, barley water, lemonade, or 'imperial drink.'

Vomiting and *diarrhœa* should not be checked (except in cholera) at first by drugs, but treated by giving only small quantities at a time of well-diluted food (milk and lime-water).

Headache may be relieved by cold applications to the head, and to vigorous people a dose of phenacetin (grs. 5) may be given and repeated in an hour's time if necessary. Not more than three doses should be given in the twenty-four hours.

Sleep may be induced by sponging the body with tepid water.

Delirium may be treated by cutting the hair short, cold applications to the head, and mustard leaves to the back of the neck. Sponging is also useful. A delirious patient should never be tied down if it can possibly be avoided. Restraint should be exercised by increasing the number of nurses. A sheet may be folded lengthwise, placed across the patient's chest, and secured to each side of the bedstead to prevent him from suddenly springing out of bed. The window must be protected by bars, or some obstacle such as a large table placed in front, as delirious patients not uncommonly attempt to escape by the window.

Pain may be relieved by friction, counter-irritants, or hot applications to the part affected. It is well to remember that the body in fever is trying to rid itself of superfluous heat, and it is a mistake to add to it by covering the surface with extensive hot applications.

High temperature, occurring suddenly and continuing at a dangerous point (104°), should be treated by sponging or cold

packs. The physician should invariably be informed and a bath prepared previous to his arrival, as he may think it necessary to reduce the temperature by this means.

Bed sores must be guarded against by scrupulous cleanliness and the daily application of spirit lotion (see BED SORES).

FEEDING DURING FEVER

The whole of the digestive apparatus is disturbed in the febrile state, and the power of digesting *starchy* food is markedly deficient. In cases of prolonged fever the failure of the stomach to carry out its functions is more marked than that of the intestines, and absorption is carried on fairly well provided that the food enters the intestine in finely divided particles. In the early stages of acute fever there is thirst and loathing for food, and for the first forty-eight hours these inclinations may be followed. By this it is not meant that no food should be given, but that the patient should be freely allowed to drink refreshing fluids, such as iced water and lemonade, whilst small quantities of fluid food, such as diluted milk, beef, mutton, chicken, or veal-tea, are given at regular intervals. If the fever persists, the regular administration of fluid food must be insisted upon, and if the tongue becomes dry, the pulse flags, the appetite fails, or the temperature continues high, alcohol must be given well diluted with milk. As the fever subsides and the tongue cleans, 'slop diet' is given, as the appetite returns 'simple diet,' and finally 'full diet' as convalescence is established.

MANAGEMENT AND TREATMENT OF CONVALESCENCE

At the termination of an illness much care is necessary. The feeding of the patient requires considerable judgment; he is usually weary of the more digestible forms of food, and has cravings for more or less unwholesome dishes. The waste of tissue has to be made up, and the appetite is often out of proportion to the digestive powers. Regularity in feeding must still be exercised, and tonics given which aid the digestion. Iron in combination with acids and the vegetable bitters is now most useful. The citrate of iron and quinine is a very

suitable preparation, and may with advantage be combined with the tincture of *nux vomica*. As strength returns, the desire for sunlight and fresh air is very strong, and the sooner the patient can be allowed to bask in the sun the better. Over-fatigue must be guarded against, and early to bed, the breakfast taken in bed, and rest after the midday meal, should be the routine at first. It is usually safer to indulge in short walks, or outings in a wheeled chair, to begin with, rather than driving in a carriage. Moving through the air at a rapid rate, the succession of passing objects, and the vibrations of the vehicle, are all rather exhausting to an invalid. The surest indication of returning strength is the improvement in the colour of the face, together with increased body weight. If the patient fails to regain flesh, or gets fat and looks white and puffy, there is good reason to suspect that there is something wrong.

PART V

ACCIDENTS AND EMERGENCIES

INJURIES TO THE SOFT PARTS, BONES
AND JOINTS

CHAPTER I

FIRST TREATMENT AND TRANSPORT OF THE INJURED

General Remarks—Stretchers—How to Act with One Helper—
With Two Helpers.

WHEN an accident has happened injuries are often aggravated by well-meant but injudicious efforts to help. As an instance of this, a man and horse fall in the hunting field, and the man is found lying senseless under the animal. A bystander first tries to pull the man out, regardless of his broken bones and the horse's weight; failing in this he strikes the horse until it stumbles to its feet and treads on the man in the process. The right way to extricate the man is to take off the saddle and place it over the injured man's head and chest, to protect them from being trodden on, and then get the horse to rise. If there are two men to help, one should look after the horse, whilst the other pulls the injured man clear directly the horse lifts its weight off. The man should then be gently rolled on to his back, the head slightly raised on a rolled up coat, any tight collar or other constriction round the neck loosened, and he should be kept quiet until he rallies, or you have formed some idea as to his injuries. If he is insensible, the *worst* thing to do is to sit him up and endeavour to pour brandy down his throat. The head should be examined for any signs of injury, and the limbs on the two sides of the body compared so as to detect any deformity, and any blood soaking through the clothes should be watched for. If there is any deformity, or bleeding from the trunk or limbs, the injured part must be bared of clothes by slitting them up at the seams, and temporary splints or dressings should be improvised and applied. It must then be decided where the nearest help lies, and whether it is better to summon the surgeon or transport the injured man to his home, or some neighbouring inn or cottage. Whatever is decided upon, send a messenger in advance to the

surgeon with a few words written on a card or torn-off shirt-cuff, briefly stating where the patient is to be found, and some guide as to the injury, so that the surgeon may bring the necessary appliances. Such a message might read: 'Come to Anchor Inn, Ripley. Insensible. Right thigh broken.'

Stretchers may be improvised out of gates, hurdles, window-shutters, or ladders. Two poles about eight feet long may be used in a variety of ways. Two holes may be cut at the corners of an empty sack, and the poles passed through the sack and the ends project through the holes. Or the sleeves of an overcoat may be turned inside out, the poles thrust through them, and the coat then buttoned up; two coats are necessary for an adult, one supporting the head and shoulders, the other the buttocks and legs.

The bearers of a stretcher must take short steps with the knees bent so as to minimise the jolting, and they must *not keep step*, or the stretcher will swing from side to side, and the patient may roll off. If a cart can be procured, it should be partially filled with hay or straw so as to make a thick bed for the patient to lie on.

Other means of transport:—

1. *With only one helper.* (1) If the injured man, A, can walk, but requires support, he must put one arm round the neck and over the further shoulder of the person assisting, B, who grasps the wrist firmly with one hand, whilst he places the other arm round A's waist. (See fig. 39.)

(2) If the injured man, A, cannot walk the helper, B, must carry him on his back. If A cannot stand it is a difficult matter for B to get him on his back. It may be done in the following way: A lies on the ground, face down-

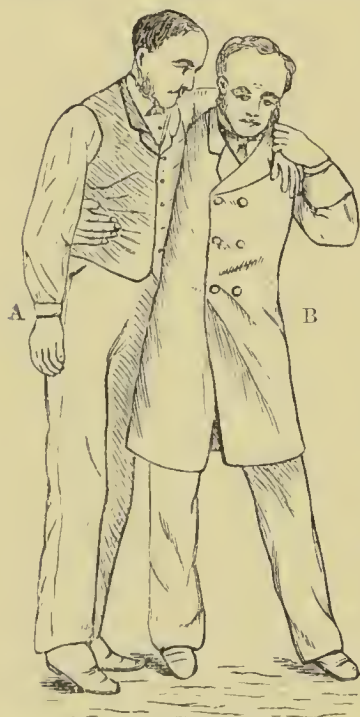


FIG. 39.—TRANSPORT OF INJURED.

wards, and B goes down on his hands and knees as flat as possible beside him. A then puts one arm round B's neck, and B then insinuates himself under A, until A has both arms round and clasps his hands in front of B's neck. B then rises with A

on his back, and as soon as he is upright he places his hands behind him to support A's thighs.

2. *With two helpers.*

(1) The injured man, A, sits on the hands of the helpers, B and C, who pass two hands under the thighs and two behind the loins; A puts his arms round the necks of B and C. See fig. 40.



FIG. 40.—TRANSPORT OF INJURED.

(2) B and C make a 'dandy

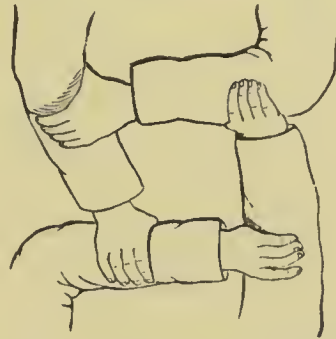


FIG. 41.—TRANSPORT OF INJURED.

chair' by joining their hands firmly together (fig. 41), on which A sits and places his arms round the necks of B and C.



FIG. 42.—TRANSPORT OF INJURED.

(3) If A is unconscious or too faint from shock or loss of blood to sit up, one helper must support the upper part of the body whilst the other, walking in front, takes the legs (fig. 42.)

After the injured man has been conveyed to a place of shelter he should be put to bed and made as comfortable as possible. In taking the clothing off every care must be taken to avoid disturbing injured parts and causing him unnecessary pain; the seams should be slit up and the garment first

chair' by joining their hands firmly together (fig. 41), on which A sits and places his arms round the necks of B and C.

removed from the uninjured side and then drawn carefully away from the damaged limb. He should then be wrapped up in blankets and allowed to rally if suffering from shock. If a surgeon has been sent for, dishes should be cleaned, a liberal supply of hot water arranged for, and other preparations made in readiness for his coming. As a rule it is best to give the patient no solid food until the surgeon arrives, as it may be necessary to administer chloroform, and a meal taken shortly before may cause dangerous vomiting. Small quantities of fluid may usually be safely given—a little weak tea, or much diluted milk and warm water; if there is great thirst, a pint of warm water with a teaspoonful of common salt dissolved in it may be injected into the bowel. If the surgeon's help cannot be obtained for several hours, or even days, liquid nourishment may be freely given, but it is best to withhold it for three hours before his arrival to give the stomach time to empty itself. Meanwhile the treatment may be begun on the lines laid down for the various conditions.

CHAPTER II

SUSPENDED ANIMATION, LOSS OF CONSCIOUSNESS, INSENSIBILITY

Fainting or Syncope—Shock—Suffocation—Poisoning—Sunstroke—
Frostbite—Head Injuries.

WHEN a person is found lying insensible or apparently dead the cause of the condition must be ascertained, if possible, before rational treatment can be adopted; when a man is found in a helpless condition, the routine practice of sitting him up, dashing cold water in his face, and endeavouring to make him swallow brandy is distinctly harmful. The following table shows at a glance the conditions which an insensible person may be suffering from and the place in this book where the treatment may be found:—

Fainting	} due to	Injury to any part of the body.
Shock		Loss of blood.
Collapse		Fright.
		Frostbite.
Stunning or Concussion	} due to	Heat exhaustion.
Compression of brain		Head injuries.
		Apoplexy.
Suffocation due to		Drowning.
		Hanging or choking.
		Foul gases.
Poisoning by		Alcohol.
		Opium and chloral.
		Poisoning of the blood due to kidney disease or diabetes.
		Bites of poisonous animals.
Diseases of the brain due to		Inflammation.
		Apoplexy.
		Epilepsy.
		Hysteria.
High temperature		Fevers.
		Sunstroke.

Dr. Lawton Roberts gives the following excellent advice as to the first steps to be taken when a person is found insensible¹:—

¹ *Ambulance Work*, by R. Lawton Roberts, M.D. London: Lewis.

‘ Always be particular to note the position of the body and its surroundings; the case may end in a law-court, and you may have to give evidence as to marks of blood, torn clothing, bruises, knives or other weapons; the state of the ground, whether much trampled on, &c.; the posture in which you find the body, and other similar matters. Try and find out the cause of the patient’s condition. Due attention to the surroundings may help you in this; thus, if the patient is lying prostrate at the foot of a ladder or high scaffolding, you would suspect concussion, compression, or other injury resulting from a fall; or if there is an empty bottle labelled laudanum, or a flask smelling of whisky, lying near, you would think the man had taken poison or had been drinking. But without loss of time you should place the patient flat on his back, with the arms to the sides and the legs extended straight close to one another, and the head slightly raised if the face is flushed, but perfectly flat if the face is pale. If there is the slightest inclination to vomit, the head should be immediately turned to one side, or the patient may be choked by the matters rejected from the stomach. You should also loosen all tight clothing about the neck and chest—collar, scarf, shirt, braces, and waistcoat—so that nothing may interfere with the breathing or with the return of blood from the head; and you should carefully examine the head, trunk, and limbs for any signs of injury—wounds, bruises, or fractures. The position of some injury may be indicated by blood, torn clothing, or by the patient clutching the part that is hurt. If the head is injured you would suspect concussion, or, if there are fixed dilated pupils, stertorous or snoring breathing, squint, drawing of the face to one side, or other signs of serious brain mischief, compression. If the trunk is severely wounded, or one of the limbs badly hurt or shattered, then you would think of shock; whereas if there is smart bleeding going on, and the face and lips of the patient are ghastly white, then you would judge that the case was one of fainting. If there is arterial or venous bleeding going on, you should of course arrest it promptly; and if the patient is in a violent epileptic fit, which you could hardly fail to recognise, you should endeavour to prevent him biting his tongue, or otherwise hurting himself. If the patient does not appear to have sustained any injury, but is flushed,

deeply insensible, his skin feeling hot, his pupils fixed and dilated—one bigger than the other—his face drawn to one side, his breathing of a snoring character, &c., then you would consider you had apoplexy to deal with. If the breath smells strongly of brandy or other stimulant, and the face is bloated and flushed, the eyes red, the pupils dilated and equal in size, the skin cool and clammy, and the pulse full and quick, then the patient is probably dead drunk. In opium poisoning the pupils are contracted to a pin's point, and this, with the slow breathing, the deepening insensibility, with the absence of any smell of stimulant, should make you suspicious of the true state of the case. If you have to deal with an insensible person, it is always best and safest to obtain medical aid as quickly as possible; and if a doctor does not happen to be near, it is better without loss of time to convey the patient on a stretcher or in a trap to the nearest hospital or surgery. In many cases it is extremely difficult to ascertain the cause of the insensibility. Indeed, there is not unfrequently a complication. Thus, a man may be dead drunk and apoplectic at the same time; or he may be so deeply and dangerously intoxicated that all your attention becomes concentrated on his drunken state, to the neglect of some important injury from which he is suffering as well—such, for example, as broken ribs or a fractured thigh.'

FAINTING OR SYNCOPE

Fainting is due to sudden failure of the heart's action. It may be caused by mental emotion such as witnessing painful sights, grief or fear; by breathing heated impure air; by loss of blood and other causes of shock; by diseases of the heart and digestive organs.

Symptoms.—There is often a premonitory stage before fainting actually takes place, such as a feeling of weakness or sickness attended with cold perspiration. The person then turns pale, clutches at the nearest support, and sinks insensible to the ground. The eyes are closed, the surface feels cold and clammy, the pulse is either imperceptible or felt with difficulty, and respiration ceases, or occurs as occasional weak sighs. The muscles are completely relaxed, and the limbs feel limp when

lifted. The attack may last a few seconds or several hours. A deep sighing breath, or some movement of the hands or face, usually marks the return to consciousness, followed by return of colour to the face and improvement in the pulse.

Treatment.—Place the patient flat on his back, and loosen the clothing. Give him fresh air by opening windows and making bystanders refrain from crowding round. Rub the limbs briskly in an upward direction. If able to swallow, diluted brandy, sal volatile, or eau de cologne may be given by the mouth; the same may be injected into the bowel if unconscious. If the attack shows signs of long duration, apply a mustard plaster or poultice over the heart. When recovery has taken place, do not allow him to attempt to stand for some time after he is perfectly conscious.

SHOCK

Causation.—Injuries, loss of blood, pain, fright, injuries and diseases of the abdominal organs.

Symptoms.—Pinched face, pale or blue lips; pulse imperceptible, or small and rapid, sometimes irregular; breathing shallow, irregular or gasping. Insensibility may be partial or complete; there may be restlessness, or the patient may lie motionless.

Treatment.—Place the patient flat on his back with the head only slightly raised. Loosen the collar and any constrictions about the neck, chest, or abdomen. Cover him with blankets or rugs, and apply hot-water bottles or heated bricks to his legs and feet. Place a mustard leaf or poultice over the heart. If he can swallow give him warm fluids such as tea, diluted milk, or broths, and small quantities of well-diluted alcohol, unless the head is injured, when alcohol is best withheld. If the patient is insensible, do not attempt to pour fluids down his throat, or you may choke him. Warm fluids, such as salt and water, may be injected into the bowel with a syringe. Smelling-salts may be held to the nose, but strong ammonia must be used with caution, as it may irritate the lungs. When reaction occurs and the patient vomits, the head must be turned to one side, any large portions of food removed with the finger, and accumulations of mucus about the nose or mouth wiped away.

SUFFOCATION

The cause of death in cases of hanging, choking, inhalation of foul air, and drowning, is the deprivation of oxygen from the tissues of the body, and the failure of the nerve centres to carry on their functions, producing the condition known as asphyxia, which literally means ‘absence of pulse.’

When a person is being rapidly suffocated, the efforts to breathe are violent and irregular. The expression becomes anxious, the eyes staring, the lips blue, and the superficial veins stand out, distended with blood. General convulsive movements then take place, and the person becomes insensible. The efforts to breathe become less frequent, and finally cease, but the heart continues to beat for some little while after all muscular movement has ceased. In gradual suffocation, which may occur from inhaling the fumes of a charcoal fire during sleep, there is no struggling for breath; the sleep becomes deeper and the blood becomes deficient in oxygen by degrees, so that the respiratory movements gradually fail, and finally the heart ceases to beat.

The treatment of these accidents consists in removing the cause of the suffocation, stimulating the circulation, and, if breathing has ceased, resorting to artificial respiration by Sylvester’s method (p. 186).

Hanging.—Obviously, when a person is seen hanging, he should at once and instantly be taken down: if a knife is at hand, cut the rope or handkerchief; if not, take off the pressure from the throat by lifting the body while a knife is fetched. Do not run for help, but act at once. Loosen the clothes about the neck and chest, and if the patient has ceased to breathe, perform artificial respiration at once. If you have anyone else to help you, or he is still breathing, dash water on his face and chest, rub the limbs vigorously upwards from the extremities towards the body, and apply smelling-salts to his nostrils; but if you are alone with a patient who has ceased to breathe, do not cease performing artificial respiration in order to seek for help or other restoratives.

Choking.—When pieces of food, a bone, a coin, a pin, or some other substance sticks in the throat, violent coughing and

retching takes place and the patient makes violent efforts to dislodge it. If the substance is a large one, obstructing the respiration, the finger should be at once passed well down the throat and an attempt made to hook it out, or at any rate dislodge it, when a violent cough will probably clear the passage, unless the lungs have been already emptied of air by previous efforts.

If the foreign body is small and sharp, such as a fragment of bone or a pin, and actually sticks into the tissues, it may often be withdrawn with a pair of artery forceps, or such instruments as sugar-tongs, or a large pair of blunt-pointed scissors, may be used in the absence of anything better, the tongue being well depressed with the handle of a spoon at the same time so as to get a good view of the object. Glove-stretchers may be used, but require both hands to grasp anything with the points.

When there is no obstruction to the breathing, swallowing a large morsel of bread will sometimes give relief; if this fails, an emetic of mustard and water or salt and water may be tried.

When a small child swallows a coin, which sticks in its throat, holding the child up by the heels and at the same time giving it a slap on the back or a shake is often effectual.

When such substances have been actually swallowed, they usually pass through the bowels without doing any mischief. The child should be fed on food of a thick consistency, such as new bread, batter-pudding, or plain boiled rice, and allowed to drink very little fluid, and that only milk. The swallowed substance embeds itself in the food, and is usually passed on the third day. No aperient should be given.

If the choking is very severe, and the patient becomes unconscious, in spite of having failed to remove the obstruction, resort to artificial respiration, as when the struggling has ceased enough air can often be pumped into the lungs to maintain life until skilled help arrives.

Suffocation by Gases.—The presence of most injurious gases, such as ordinary gas used for illuminating purposes, may be detected by the sense of smell, but ‘carbonic acid’ and the infinitely more poisonous ‘carbonic oxide’ gas are inodorous, and are often the cause of death. *Carbonic acid* is a heavy

gas which collects in disused pits, cellars, brewers' vats, and wells, and is a product of respiration and all forms of combustion. When inhaled in a concentrated form it causes rapid insensibility and death; when diluted it causes headache and drowsiness, and the person has difficulty in breathing, his blood becomes dark purple, and finally he becomes insensible and dies.

Carbonic oxide is produced by combustion taking place in a confined atmosphere. It usually exists with other gases, and is the cause of death from inhaling the fumes of burning charcoal, or of a furnace without a flue. Unlike carbonic acid, it gives to the blood a bright cherry-red colour when inhaled in a pure condition, but the other symptoms it produces are similar.

Before entering a well or cellar which has been closed for some time, precautions should be taken that it is free from noxious gases. The coverings should first be removed, and after having been left uncovered, a lighted candle should be lowered and the flame watched. If it burns unsteadily or goes out, there is certainly some poisonous gas present, and some means must be devised to get rid of it. Quicklime thrown plentifully into such places, with water sprinkled on it to slake it, rapidly absorbs carbonic acid. Wells may be cleared by lowering an opened umbrella, and repeatedly drawing it up and lowering it again. When a room is known to be full of gas all lights should be extinguished, and the door and windows thrown widely open. If the windows cannot be opened, the panes of glass should be broken. If a person is found insensible, he should be at once dragged into the fresh air, or to the open window, the clothing loosened, and water dashed on to the face and chest. If breathing has ceased perform artificial respiration.

Drowning.—The following directions for restoring persons apparently drowned are taken from the instructions issued by the Royal Humane Society:—

Send for medical assistance, blankets, and dry clothing, but proceed to treat the patient *instantly*; and, when possible, *in the open air*, exposing the neck, face, and chest to the wind, except in extremes of weather, as intense cold, heavy rain, or snow, &c.

The points to be aimed at are, *first* and *immediately* the restoration of breathing; and *secondly*, after breathing is restored, the promotion of warmth and circulation.

The efforts to restore life must be persevered in until the arrival of medical assistance, or until the pulse and breathing have ceased for an hour.

THE SYLVESTER METHOD OF RESTORING NATURAL BREATHING

Rule 1. *To adjust the patient's position.*—First lay the patient flat on his face, supported by folded articles of clothing, with one of the arms under the forehead, and the head rather lower than the body, so that any water in the mouth and air passages may drain off; then quickly place the patient on his back on a flat surface, inclined a little from the feet upwards; raise and support the head and shoulders on a small firm cushion or folded article of dress placed under the shoulder-blades. Remove all tight clothing from about the neck and chest, such as collar, necktie, scarf, braces, stays, belt, &c.

Rule 2. *To maintain a free entrance of air into the windpipe.*—Cleanse the mouth and nostrils; open the mouth; draw forward the patient's tongue, and keep it forward. An elastic band over the tongue and under the chin will answer this purpose.

Rule 3. *To imitate the movements of breathing.*—*Firstly*, induce inspiration. Place yourself at the head of the patient, grasp his arms just above the elbows, raise them upwards by the sides of his head, stretch them steadily but gently upwards for two seconds. (By this means fresh air is drawn into the lungs by raising the ribs; see fig. 43, Inspiration.)

Secondly, induce expiration. Immediately turn down the patient's arms, and press them firmly but gently downwards against the sides of his chest for two seconds. (By this means foul air is expelled from the lungs by depressing the ribs; see fig. 44, Expiration.)

Thirdly, continue these movements. Repeat these measures alternately, deliberately, and perseveringly fifteen times in a minute, until a spontaneous effort to respire be perceived. (By these means an exchange of air is produced in the lungs similar to that effected by natural respiration.)

Rule 4. *To excite respiration.*—While you are busy performing artificial respiration, someone else should excite the nostrils

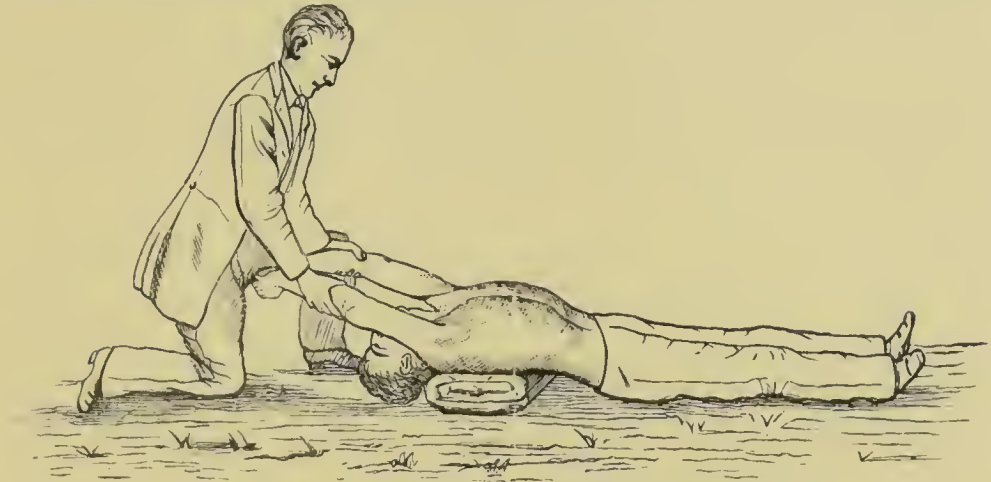


FIG. 43.—INSPIRATION (SYLVESTER'S METHOD).

with snuff or smelling-salts; tickle the throat with a feather; rub the chest and face briskly, and dash cold and hot water

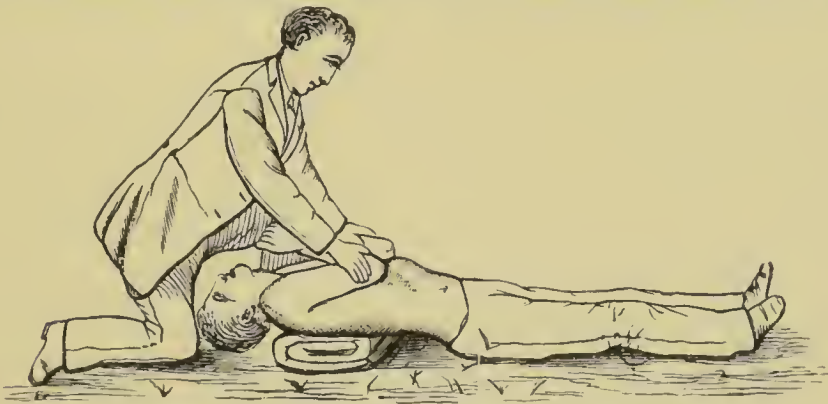


FIG. 44.—EXPIRATION (SYLVESTER'S METHOD).

alternately on them, or flap the chest with a wet towel; and rub the body and lower limbs with dry flannel or cloths.

TREATMENT AFTER NATURAL BREATHING HAS BEEN RESTORED

To induce circulation and warmth.—Wrap the patient in dry blankets or warm clothing (which, if necessary, can usually be borrowed from the bystanders); and rub the limbs upwards energetically, thus pressing the blood along the veins towards the heart. Promote the warmth of the body by hot flannels, bottles, or bladders of hot water, heated bricks, to the pit of the stomach, the armpits, and to the soles of the feet.

On the restoration of life, when the power of swallowing has returned, a teaspoonful of warm water, small quantities of wine, warm brandy and water, or coffee should be given. The patient should be kept in bed, and a disposition to sleep encouraged. During reaction large mustard plasters to the chest and below the shoulders will greatly relieve the distressed breathing.

POISONING

Cases of poisoning require prompt treatment, and an endeavour has been made to place the more prominent symptoms of acute poisoning in the form of a table for rapid reference. It will be noted that a detailed description of the symptoms is omitted. In all probability the ordinary reader will not have to treat a case more than once in a lifetime, and when he has to face that emergency he will not have time to study several pages of letterpress in order to make an absolutely correct diagnosis. The science of chemistry has now made the detection of poison so accurate that drugs are rarely resorted to for the purpose of murder. When taken by accident, or by would-be suicides, the nature of the poison is usually at once discoverable by the bottle which contained it. When several members of a family are seized with similar symptoms, the poison has almost invariably been contained in some form of food or drink, and this may often be ascertained by finding out from the unaffected persons what dish or fluid they happened to abstain from.

Note.—When a case of poisoning occurs—

1. Send at once for a doctor.
2. If the poison is known, look for the drug in the following table (pp. 190–92), or refer to the Index at the end of the book.
3. When the poison is unknown be guided by the prominent symptoms.
4. Emetics are not to be used if the interior of the mouth is discoloured or scorched by strong acids or caustics.
5. Emetics are required in treating most poisons; use one of the following :—
 - (i.) Common table-salt, 4 tablespoonfuls, in water, 1 pint.
 - (ii.) Mustard, 1 tablespoonful, in water, 1 pint.

- (iii.) Zinc sulphate, gr. 30, in water, 4 tablespoonfuls.
 (iv.) Ipecacuanha wine, 1 or 2 tablespoonfuls in water.
 (v.) Ipecacuanha powder (not Dover's powder), $\frac{1}{2}$ teaspoonful in water.
 (vi.) Carbonate of ammonia, $\frac{1}{2}$ teaspoonful in water.
 (vii.) Alum, 1 tablespoonful in water.

6. Plaster or whiting can be got by scraping a white-washed wall, or knocking plaster down from the ceiling with a broom-handle, or by throwing up a poker or flat-iron. Powder the plaster and mix with water.

7. Stimulants should be injected into the bowel if swallowing is impossible or vomiting severe—brandy, whisky, sal volatile, black coffee.

Acute Poisoning

BERRIES OR LEAVES OFTEN EATEN BY CHILDREN*

Belladonna or Nightshade	Treatment as for Belladonna.		
Stramonium or Thornapple	„	„	„
Bryony	„	„	„
Aconite or Monkshood .	„	„	Aconite.
Holly	„	„	„
Laburnum	„	„	„
Privet	„	„	„
Arum (Lords and Ladies) .	„	„	Cantharides.
Yew	„	„	Anilin.

OTHER SUBSTANCES PRODUCING POISONING IN CHILDREN

Crayons, coloured chalks .	Treatment as for Lead.		
Soothing syrups . . .	„	„	Opium.
Teething powders . . .	„	„	„

III. Abdominal pain and constipation.

25. Lead: 'sugar of lead,' 'white lead,' Colic round the navel . . .
'Goulard water,' lead lotion

IV. Abdominal pain with evacuations of blood.

26. Cantharides: Spanish fly, blistering fluid and plasters . . .
27. Phosphorus: 'Rat-paste' . . . Smell . . .

V. Muscular spasms, cramps and convulsions.

28. Strychnine: 'vermin-killers,' Battle's, Body arched backwards . . .
Butler's, Gibson's
29. Nux vomica

VI. Difficulty in breathing; collapse.

30. Hydrocyanic acid, prussic acid: cyanide of potash, laurel water, oil of bitter almonds . . .
31. Cocaine Often from local application .

VII. Weakness in the limbs; mind unaffected.

32. Aconite, monkshood, root eaten in mistake for horse-radish; aconite liniment . . .
33. Calabar bean, physostigma, 'ordeal bean' . . .
34. Conium, hemlock, eaten in mistake for parsley
35. Tobacco: nicotine Smell
36. Curari, woorara: poisoned arrows of savages

VIII. Weakness in the limbs; excitement.

37. Alcohol: drunkenness Smell. Face flushed. Pupils dilated
38. Belladonna, atropine, deadly nightshade: medicines, liniments, eye-drops . . . Dilated pupils. Thirst. Difficulty in swallowing. Face flushed
39. Hyoscyamus, henbane
40. Stramonium
41. Indian hemp (*Cannabis indica*) . . . Hysterical crying and laughter

Emetics. Sulphate of soda or sulphate of magnesia, one tablespoonful, in water, half-pint. Milk. White of egg. Barley-water. Poultices.

Emetics. Tea or coffee. Tannic acid. Gruel. Barley-water. Poultices.
Emetics. French oil of turpentine, half a teaspoonful every half-hour for two hours. Sulphate of magnesia, one tablespoonful. Water, half-pint. Barley-water.

Emetics. Strong coffee or tea. Tannic acid. Tincture of iodine, half-teaspoonful, in water, half a tumbler. Bromide of potassium, 2 *drachms*, in water, half a tumbler. Artificial respiration.

Emetics. Stimulants. Ammonia inhaled. Brandy injected into bowel. Artificial respiration. Hot and cold douching.
Stimulants. Brandy or sal volatile. Ammonia inhaled. Artificial respiration.

Emetics. Artificial respiration. Stimulants. Warmth. Tannic acid. Strong tea or coffee.

Ligature above and wash out wound. Stimulants. Artificial respiration.

Emetics. Hot strong coffee. Keep patient awake by flicking and pinching. Artificial respiration. Ammonia and warmth if collapsed.

Acute Poisoning—Continued.

<i>Characteristics.</i>		<i>Treatment.</i>
IX. Deep insensibility.		
42. Opium and morphia preparations : 'black drop,' laudanum, 'soothing syrups,' teething powders, paregoric, Dover's powder, compound ipecacuanha powder, chlorodyne, syrup of poppies	Pupils contracted. Eyes half shut. Muscles relaxed. Skin cold	Emetics. Rouse him by flicking, shouting, pinching. Hot strong coffee injected into bowel. Artificial respiration. Ammonia if collapsed, not brandy or whisky.
43. Chloral	Pupils dilate when aroused, otherwise contracted	Same as opium. Keep up warmth by blankets and hot bottles. Nux vomica tincture, m10, every half-hour till he rallies.
44. Turpentine	Smell	Emetics. Sulphate of magnesia or soda, one table-spoonful in water, half a tumbler. Milk. White of egg. Barley-water.
X. Prostration, lividity, blue lips.		
45. Aniline dyes sweetmeats	Smell	Emetics. Stimulants. Strong coffee. Mustard leaves and friction over heart and limbs. Warmth. Artificial respiration.
46. Antipyrin	
47. Antifebrin	
48. Phenacetin	
49. Paraffin oil, petroleum	Smell	
50. Vaseline	
51. Camphor	Smell	
52. Chloroform (swallowed)	Smell. Burning pain in throat and stomach	

<i>Symptoms.</i>	
Acute poisoning by food.	
Tainted meat	Colic. Vomiting. Diarrhoea. Nettle-rash. Excitement. Collapse. Insensibility
Fish	
Mussels	
Oysters	
Mushrooms	
Fungi, toadstools	Emetics. Castor oil, two tablespoonfuls. Stimulants. Poultices and warmth. Artificial respiration.
N.B. Bear in mind the possibility of copper or lead poisoning.	

CHRONIC POISONING

Alcohol.—The condition is often present in persons who are never drunk, but habitually tipple or nip between meals.

Symptoms.—Loss of appetite, mental irritability, tremor of the hands, and dyspepsia, most marked in the morning. Tendency to corpulence, and blotchy eruptions on the face. After a time cirrhosis of the liver occurs; morning vomiting and diarrhœa, nose bleeding, piles, abdominal distension, and wasting of the muscles of the limbs. After a continued period of alcoholic excess *delirium tremens* may appear as the result of an exaggerated debauch, the shock of an injury, or being cut off from the accustomed dose of stimulant. The onset is usually marked by restlessness, tremor of the face and hands, stammering and excited speech. The symptoms become worse at night, and there is a tendency to get out of bed and wander about. Sleeplessness and excitement increase; there is constant muttering or conversing with imaginary people. There may be terrifying and loathsome hallucinations—the ‘ horrors ’—but laughter sometimes alternates with shrieking and cursing.

Treatment.—The habit of tipping is easier to avoid than to abandon. Stimulants are better avoided by persons with an inherited tendency to intemperance. The habit is best broken by change of surroundings, outdoor exercise, and quenching thirst with fruits. The indigestion must be treated with nuxvomica and acids; see DYSPEPSIA, CONGESTION and CIRRHOSIS OF LIVER. In *delirium tremens* the strength must be supported and sleep induced. Except in extreme cases alcohol must be altogether cut off. When necessary to give it, the daily allowance must be rapidly diminished until it can be altogether discontinued. It must always be given with food such as egg, milk, or meat-juice mixtures. Ice may be freely sucked, and strong black coffee given. The patient must not be left alone day or night, and his room must be kept dark and cool. He must be given fluid food frequently, broths, milk and soda, and beaten-up eggs. Sleep may be induced by tepid sponging and bromide of potassium in large doses. Opium is invaluable in many cases, but requires great care and judgment, and must only be given under medical supervision.

Arsenic.—Chronic poisoning is most often caused by the colouring-matter in wall-papers, dresses, toys, carpets and blinds.

Symptoms.—Smarting and redness of the eyes, the face white and puffy. Metallic taste in the mouth, thirst, loss of appetite, pain in the stomach, vomiting, diarrhoea with slimy motions. Aching pains and feebleness in the limbs. The skin dry, harsh, and dirty-looking.

Treatment. Find the source of the arsenic. The poison often present in white as well as green articles. Change of surroundings. Iron tonics.

Lead.—‘Painter’s colic,’ ‘lead colic,’ ‘wrist-drop.’

Occurs in persons handling lead, particularly if they take their meals without washing their hands. Water, cider, or beer contained in lead vessels. Cisterns recently scraped. Hair dyes and face powders. Adulterations, or food packed in lead foil.

Symptoms.—Pain round the navel and constipation. Mouth foul and a blue line at the edge of the gums round the teeth. Thirst and loss of appetite. Skin sallow, cold sweats and prostration. If continued, pains in the limbs and wasting of the muscles; the extensors of the wrist usually first affected, so that the ‘wrists drop’ when the arms are extended.

Treatment.—Give an aperient, grey powder or blue pill at night, saline in the morning. Give a mixture containing sulphuric acid—sulphate of iron grs. 3, dilute sulphuric acid ℥15, sulphate of magnesia ʒ1, water ʒ1—three times a day. Good food, oils and fats. Belladonna liniment to abdomen if much pain.

Mercury.—Chronic poisoning is usually due to medicines taken for constitutional disease, sometimes to external applications and skin lotions.

Symptoms.—Offensive breath; coated tongue; profuse flow of saliva; metallic taste in the mouth. Gums red and swollen, teeth become loose, there may be intense pain in the jaw or neuralgia of the face. Anæmia and muscular tremors, diarrhoea.

Treatment.—Remove the cause. Wash the mouth fre-

quently with chlorate of potash. Iron tonics. Milk and eggs beaten up.

Morphia and Opium.—The habit of morphia-taking is usually acquired by self-administration of the drug, for the relief of pain at first, and subsequently to satisfy craving.

Symptoms are at first not pronounced. Sallow complexion and emaciation. Restlessness, lassitude and depression. Sleeplessness. Itching of the skin; sometimes irregular fever and sweating. ‘Persons addicted to morphia are inveterate liars, and no reliance whatever can be placed upon their statements.’

Treatment can rarely be carried out at home. The patient must be isolated, the morphia daily reduced in quantity, and finally withheld; he will beg, bribe, and lie in order to obtain it, so the nurse must be thoroughly trustworthy. Stimulants and sedatives require great discretion in their use. Fluid diet. Warm sponging for restlessness. Prevention is better than cure; and no one, medical men included, should ever give himself a morphia injection.

SUNSTROKE. HEATSTROKE

Sunstroke most often affects people who are undergoing severe muscular exertion in a hot sun, particularly if their clothing is tight around the neck and chest, and if they have been taking alcohol. The attack may come on suddenly, the patient falling insensible as if stunned, without any warning; but more often there is premonitory headache and dizziness, and gradual loss of consciousness. The face is flushed, the pulse rapid and full, and the temperature is extremely high, 107° or even 110°.

Treatment.—Loosen the clothing and pour cold water over the patient immediately. Then strip off the clothing, and if ice is at hand rub the surface of the body with it; if ice cannot be obtained, cover the patient with a sheet and keep it drenched with cold water. As consciousness returns large quantities of cold water may be given him to drink; if he continues insensible, inject it into the bowel and apply mustard-leaves to the nape of the neck, the arms, and the calves of the legs. The

patient is very sensitive to heat after recovery, and for some time must refrain from exposing himself to a hot sun or exerting himself in hot weather.

Heatstroke or heat exhaustion is caused by prolonged exposure to high temperatures, especially if the air is close and vitiated. Stokers and workmen in iron foundries are frequently attacked. The condition is very different from sunstroke, being simply that of shock, and is attended with feeble pulse and low temperature; the patient is usually conscious or semi-conscious, and there may be restlessness or delirium.

Treatment as for shock. Stimulants, and a warm bath if the temperature is subnormal.

FROSTBITE AND CHILBLAINS

Prolonged exposure to severe cold produces the following symptoms. There is first shivering and the skin becomes pale, cold and wrinkled; then the limbs feel stiff and heavy, and the senses become confused; the speech is stammering or incoherent, and there is often an intense desire to sleep, which if yielded to leads to insensibility. The desire to sleep is not invariable, and delirium may take its place. The effects of cold are not unfrequently mistaken for drunkenness, and the two are difficult to distinguish, especially in people who have been drinking spirits 'to keep the cold out.' The effect of cold on the tissues closely resembles that of heat, if it is not sufficient to destroy the vitality of the tissues entirely. When the cold is very intense and the exposure prolonged, the part becomes first red and tender, then dead white, hard and insensitive. When in this condition, vitality may be completely destroyed, or recovery may take place if thawing is effected gradually. If this takes place too rapidly, severe inflammation follows, and the part may become gangrenous from being choked with blood and serous exudation.

Treatment.—The greatest care must be exercised to restore vitality gradually. Place the patient in a cold room, but the fire may be lit so as to warm it gradually. Strip off the clothes and cover him with a blanket; rub the surface of the body

first with snow, then with the hands dipped in cold water, and lastly with the dry hands or with a flannel. Treat the frost-bitten parts with the utmost gentleness. Small quantities of warm fluid such as tea or beef tea should be given at frequent intervals, but alcohol must not be given at first, and subsequently only in small quantities well diluted. As reaction sets in the injured parts should be wrapped in cotton wool, kept on with a lightly applied bandage, and raised on pillows. They must be carefully watched and treated in the same way as burns; if blisters form they should be snipped, and if ulceration or gangrene occurs, antiseptic dressings must be used.

Chilblains are most common in young people; the toes, fingers, ears or nose are the parts usually affected. The parts become swollen and red, and there is a sensation of burning or itching in them, which is aggravated by the heat of a fire or by getting warm through exercise. When the inflammation is severe, blistering or ulceration of the skin may take place, and the chilblain is then said to be 'broken.'

Treatment.—Chilblains may often be prevented in children by tonics, and small quantities of stimulant given twice a day with their food. Badly-fitting and damp boots are a common cause. They should indulge in some active exercise, such as skipping, for a few minutes before going to bed and directly they are dressed in the morning. The feet and hands may be bathed in hot salt and water. When the chilblains are forming they may be painted with tincture of iodine every second day, or belladonna and glycerine may be rubbed in twice a day. When the skin is broken, boracic ointment or wet boracic lint dressing should be used, and the parts kept warm and protected from irritation by being wrapped in cotton wool.

HEAD INJURIES

Concussion of the brain.—When a person immediately after receiving a blow on the head falls senseless, he is said to be 'stunned' or 'concussed.' Opinions differ as to what is the actual condition of the brain causing this loss of consciousness; some hold that it is simply due to the nervous structures being shaken, others that it is due to failure of the

circulation in the arteries, and others attribute it to the contusion and laceration of the brain substance, however slight, which probably always occurs. Whatever may be the actual cause, the condition produced is one of 'shock,' which may last for a few moments only, or for several days. He may be completely unconscious, but can usually be roused by speaking to him in a loud voice. The other symptoms of shock are present, coldness of surface, feeble pulse, and shallow breathing. After remaining in this condition for a variable time he usually vomits, and the stage of reaction sets in; the skin becomes flushed and warm, the pulse stronger, and the temperature usually rises, with more or less headache. Death sometimes occurs without any signs of rallying, or the signs of 'compression' of the brain may follow directly, or after reaction has set in. For some time after the accident there may be headache, loss of memory, irritable temper, weakness in the limbs, and other signs of nervous affection. They are most often met with in intemperate people, but sometimes occur in typically healthy individuals, even after a slight concussion, if allowed to exert themselves too soon.

Treatment.—Roll the patient gently on to his back, and slightly raise the head on a rolled-up coat or small pillow. *Do not be in a hurry to rouse him; do not give him brandy, and prevent other people from doing so.* Remember that there is no way of knowing what injury the brain has received; blood vessels may be lacerated, and you can do nothing to arrest the hæmorrhage. Nature endeavours to do this by keeping the circulation quiet and allowing the blood to clot; you frustrate her efforts by giving stimulants and exciting the circulation. He should be carried home lying flat, and placed in bed wrapped up in blankets, and if he has not rallied hot-water bottles should be placed at his feet, and he may be given warm fluids to drink, such as tea. If the shock continues, after some hours a mustard-leaf should be applied to the heart and the limbs gently rubbed. Calomel, grs. 5, should be placed on the tongue and a little fluid given to wash it down. When reaction sets in the patient will often say that he feels perfectly well, and will want to get up, but he should be persuaded to remain in bed, and cold applications, an ice-bag or towels kept wet with cold water, applied to the head. He must only be given fluid

food, and he must be carefully watched for signs of 'compression' coming on, at any rate for the next twelve hours. However slight the concussion, a patient should, when possible, be kept absolutely quiet for at least one week after the accident, and avoid any great excitement, worry, or exposure to a hot sun for another month. Some of the worst cases of nervous breakdown are met with in men who, after being concussed for a few moments, have got up and gone on with their work as if nothing had happened.

Compression of the brain.—Compression of the brain may be due to the skull being fractured and the bones driven in, or to bleeding going on within the skull and the blood pressing on the brain. The patient is almost invariably concussed at first, and if the bones are driven in does not rally, but the symptoms gradually merge into those of compression. When due to hæmorrhage the signs of concussion may pass off, the patient rallying partially, or appearing quite well, and then relapsing into the condition of compression. He is usually completely unconscious, the face flushed, the skin sweating, the pulse slow but full and strong; the pupils may be unequal or the eyes squinting, and there may be complete or partial paralysis of the limbs. The breathing is peculiar, the air being drawn in with a snorting or sniffing noise, and puffed out.

Treatment.—A surgeon must be summoned immediately. Until he arrives the same treatment as for concussion must be adopted. Any wound in the head must be covered with a thin clean dressing, so as not to interfere with the application of cold. The bowels must be freely purged, and the bladder will probably have to be relieved by the use of a catheter.

Inflammation of the brain.—Inflammation of the brain and its membranes may follow concussion, wounds of the scalp and skull which have become poisoned, diseases of the ear attended with suppuration, burns and scalds. It may also be caused by many diseases, such as tuberculosis, erysipelas, and the acute fevers.

The symptoms are fever, often rigors, pains in the head, vomiting or retching, rapid pulse, flushed face, and contraction

or inequality of the pupils. Convulsions or paralysis may occur, and the patient become insensible and die.

Treatment.—Rest in bed in a darkened room. The bowels should be relieved thoroughly. Fluid diet. Ice-bags to the head, which should be shaved. Blisters to the nape of the neck. The cause must be treated if possible. Bromide of potassium, or phenacetin, relieves the headache, but does not cure the disease.

CHAPTER III

INJURIES OF THE SOFT PARTS

Contusions and Wounds—Natural Process of Healing—Failure of Healing—Suppuration—Constitutional Effects of Injury—Treatment of Contusions—Treatment of Wounds—Cleansing—Arrest of Bleeding—Closing Wounds—Dressings—Special Treatment for different varieties of Wounds—Constitutional Treatment—Burns and Scalds.

CONTUSIONS AND WOUNDS

WHEN the tissues of the body are injured by any form of violence certain changes take place, more or less marked according to the severity of the damage and the 'vital resistance' of the part. Whether it is simply a bruising of the skin, or an injury so severe as to lacerate the tissues and break the bones, there is one thing that always takes place, i.e., *extravasation of blood*. This occurs whether the skin is broken or not. There are certain names applied to different kinds of injury to the soft parts which will have to be frequently referred to, and for convenience we state them here.

A bruise or contusion=An injury to the soft parts without the skin being broken.

An abrasion or graze=Destruction of the upper layers of the skin, the deep layers remaining intact.

A wound=Injury to the soft parts with perforation of the skin.

An incised wound=A clean cut with a sharp instrument.

A punctured wound=A small skin wound inflicted by some sharp-pointed instrument penetrating the underlying tissues to a greater or lesser depth.

A contused wound=Breaking of the skin and bruising of the tissues; usually caused by some blunt instrument.

A lacerated wound=Tearing of the skin and tissues; produced by the claws of an animal, or by a sharp instrument puncturing the flesh and being dragged through.

A *lacerated contused wound* is a combination of the above conditions, often caused by a limb being crushed in machinery, or by falls from a height on to rough ground.

Nature endeavours to heal all these varieties of injury in the same way, but success is largely influenced by the following conditions : (1) Whether the skin is broken or not, *i.e.*, whether any poison or disease-producing microbes have obtained admission ; (2) the health of the tissues ; (3) whether the injured part can be kept at rest, or is constantly disturbed.

We will now briefly describe what takes place after an injury, (1) when the skin is unbroken ; (2) when there is a wound.

I. The healing of contusions.—On receipt of the injury the tissues beneath the skin are more or less lacerated, blood flows from the torn vessels and extravasates into the surrounding tissues. The amount of blood escaping depends on the vascularity of the tissues and the severity of the injury. The extravasated blood clots, and the bleeding is gradually arrested by the torn vessels becoming blocked. The changes already described, called inflammation, now occur, and the clot and surrounding tissues become invaded by leucocytes¹ and infiltrated with serum. The blocked blood-vessels throw out little buds, which gradually grow and penetrate the clot and leucocytes. These budding vessels join with one another, and the blood in them moves on and circulation is restored. Meanwhile the clot is being slowly absorbed, the mass of leucocytes begins to diminish ; some alter their form and become part of the once damaged tissue, others return to the blood-vessels and are swept away.

II. The healing of wounds.—When the skin is broken the blood from the ruptured vessels flows from the aperture to a greater or less amount. This escape of blood is not an unmixed evil, as by this means any dirt or poison which may have entered the wound is often washed out. The bleeding gradually ceases, partly by the clotting of the blood, partly by contraction and plugging of the vessels. If all goes well and the edges of the skin are kept together and at rest, healing takes place in

¹ In the following pages the white corpuscles and the fluid of the blood are frequently mentioned as 'leucocytes' and 'serum.'

exactly the same way as it does when the skin is unbroken : the breach in the tissues becomes filled up with serum and leucocytes, and the blood-vessels shoot out buds, which unite and form loops. If the edges of the wound are not brought together the intervening space is gradually filled up by the growth of fresh loops and the exudation of fresh leucocytes. If we look at the raw surface of a healthy wound which is beginning to heal we can see these loops of new vessels forming bright pink elevations about the size of a split mustard-seed, and these are called 'granulations,' or popularly 'proud flesh.' These granulations in an open wound are exposed to more or less irritation, and some of the leucocytes perish and are shed off as pus. By degrees, however, the gap is gradually filled up by the development of these granulations, and the skin begins to grow over them from the margins of the wound until it is entirely covered, and only a scar is left to show where the wound once existed. After healing is completed the scar always contracts somewhat, and if the surface destroyed has been very extensive, as in burns, the contraction may produce very great deformity.

The healing of a wound may be delayed or prevented by—

1. The presence of microbes in the wound. These may be introduced at the time the injury is inflicted, or subsequently, by dirty fingers or instruments coming in contact with the wound, or by the discharges becoming infected by the microbes which exist on the surface of the skin. It has already been stated that many microbes are harmless, but if any of those capable of producing disease are introduced and not washed out by the bleeding or subsequent cleansing of the wound, they commonly cause irritation running on to suppuration. The inflammation may be only local, but some microbes multiply rapidly, spread along the lymphatics, and cause similar inflammation in the nearest lymphatic glands, or, what is even more serious, multiply in the blood and cause general infection.

2. Want of rest. If an injured part is not kept at rest the clotting of the blood is interfered with, the formation of the new blood-vessels may be prevented, and the exuded leucocytes may become pus cells.

3. The presence of foreign bodies—splinters, grit, pieces of clothing, and bullets—may cause irritation by mechanically

pressing on the surrounding tissues, and by conveying microbes into the wound. Clean substances with smooth surfaces, such as bullets, may lodge in the tissues, and if undisturbed give little or no trouble for years.

4. Large masses of blood-clot, or exuded serum, which cannot escape are favourable soils for the growth of microbes, and also cause irritation by distending the wound and producing tension. Punctured wounds, which have a small opening in the skin compared with the depth of the wound, often suppurate, owing to the opening becoming blocked and the discharges being pent up.

5. The injury may cause the death of the tissues in large or small portions. These act as foreign bodies, and have to separate by ulceration and be cast off in the discharges as 'sloughs' before the wound can heal. Lacerated contused wounds comparatively rarely heal quickly, owing to the vitality of the tissues being in part destroyed.

6. The patient's general vitality may be low, his circulation feeble, the kidneys diseased, or disease-producing microbes already existing in his blood, ready to lodge and grow in a suitable locality, such as a contused or wounded tissue.

Suppuration

Any of the above conditions may cause the tissues to inflame to a greater degree than is necessary for the process of healing, and suppuration may take place. When suppuration occurs, the tissues around the wound become swollen, red, hot, and tender, and there is usually marked throbbing pain. If the pus cannot escape, and collects in any quantity, it forms a swelling, an *abscess*, the circumference of which feels hard, and the centre soft or elastic. On putting the two forefingers on the swelling, just within the hard margin, and making gentle pressure with each finger alternately, the pus in the abscess is displaced by the finger making pressure, and may be felt to rise like a wave under the other finger; this is called 'fluctuation,' and is strong evidence of pus or fluid being present.

If the pus is pent up and cannot escape, the temperature of the body rises, and there are more or less marked symptoms of fever. The pus should be liberated immediately by one of the methods to be presently described.

The Constitutional Effects of Injury

Shock or **collapse** has been already described. This may be due to fright, pain, loss of blood, or a combination of these causes. It usually occurs almost immediately after receipt of the injury, and passes off after a longer or shorter period according to the severity or locality of the injury, and is followed by the symptoms of reaction.

Fever accompanies the reaction; the temperature is usually highest on the second day, and is rarely above 101° F., falling to normal on the third or fourth day. The constitutional disturbance is very slight, and the patient often does not feel ill, though there is usually thirst.

If, instead of falling, the temperature rises on the third day, and the patient seems ill, and headache, fits of shivering, or throbbing pain at the seat of injury are complained of, with other febrile symptoms, the wound must be carefully examined. There is probably suppuration occurring, due to pent up clot, serous discharge, or the presence of microbes.

The Treatment of Injuries of the Soft Tissues

Bruises and contusions.—It must be remembered that severe injuries may be inflicted without the skin being broken, owing to its elasticity and toughness. A man may be thrown from a horse, struck by some heavy object, or squeezed by a wheel passing over him, and sustain rupture of some internal organ with little or no external bruising. Our treatment must, therefore, be guided by the nature of the accident and the general condition of the patient, rather than by the amount of contusion seen. If he has been stunned, no stimulant should be given; if he is suffering from shock, stimulant should be given with great caution, lest we aggravate any internal bleeding. He should be placed in a horizontal position, wrapped up in blankets, and hot-water bottles or heated bricks placed at his feet.

Rest is the important factor in his treatment. If the *head* is injured, the hair should be cut short for the sake of coolness.

Contusions of the *chest*.—Place the patient on the *injured* side, so that its movements are limited, and the other lung can

act freely. He should talk as little as possible, and only in a whisper.

Abdomen.—Place the patient on his back, bend the thighs slightly by placing a pillow under the knees, and give only fluid food in very small quantities.

A contused *arm* should be placed in a sling, a *leg* elevated on pillows above the level of the trunk so as to help the circulation.

Local treatment.—1. Apply *cold* to the part for twelve hours. This may be effected by—

(i.) Ice in an ice-bag, bladder, or mackintosh sponge-bag. One layer of lint or linen should be interposed between the bag and the skin.

(ii.) Cloths dipped in cold or iced water, laid on the part and frequently renewed.

(iii.) Evaporating lotions—rectified spirit, brandy, whisky, or methylated spirit, 4 oz. to the pint of water; or lead lotion.

Ice-bags may be applied to the head for long periods, but when used for other parts some caution must be exercised, lest the vitality of the skin suffer.

2. Wrap the part up in cotton wool, and apply a bandage, so as to keep up *gentle* pressure, and aid the absorption of the exuded blood.

3. As the pain and swelling subside the parts may be douched twice daily with hot water, dried, and the wool and bandage re-applied until all swelling has disappeared.

If the skin has been much damaged, though not actually broken, cold should not be applied to it, as this would very probably lead to ulceration. It is better under these circumstances to use fomentations of warm lead or boracic lotion.

The Treatment of Wounds

There are certain broad principles which we must follow in treating wounds, but which have to be modified under certain circumstances. We here state the general principles of treatment, and subsequently touch on the conditions which call for special treatment.

1. Arrest the bleeding.

2. Cleanse the wound, and remove any blood-clot, grit, and foreign bodies.
3. Bring the raw surfaces together.
4. Allow for the escape of any discharge.
5. Protect it from the air, and prevent the discharges from decomposing.
6. Keep the part at rest.
7. Attend to the patient's general health.

Without doubt, the arrest of bleeding and the cleansing of a wound are the most important points in our treatment, but as severe bleeding is of comparatively rare occurrence, and cleanliness is important in the treatment of every wound, however trivial, we give precedence to the latter.

Cleansing a wound.—The most important thing in the treatment of wounds is absolute cleanliness. It had been known for ages that if the skin were intact after the infliction of an injury, recovery usually took place without much further trouble, but that suppuration and blood poisoning often followed a trivial wound, and this was attributed to the entry of air. It has been clearly proved, however, that pure air has no unfavourable influence on wounds, but the disturbance is due to the entry of microbes which are present in foul air, on the skin, and wherever there is dust or dirt. By teaching us how we can prevent the entry of these microbes into wounds, Lister has made his name immortal among civilised nations. His method of treating wounds, usually spoken of as the antiseptic (which means *preventive against putrefaction*) treatment, is capable of variation in many ways, but our object must always be the same, that is—to make the wound and the surrounding parts, and everything brought in contact with it, fingers, instruments, and dressings, absolutely clean.

It is not possible to clean the wound, fingers, and instruments by the same means, and we must use : (1) disinfectants ; (2) heat ; and (3) soap and water, in one way or another.

Disinfectants are chemical substances, and there are many kinds used. Some, and the most efficient, such as perchloride of mercury and carbolic acid, are highly poisonous, and, unless used with discretion, are liable to produce very great irritation if applied to a raw surface. It is impossible to discuss here the

relative merits of the various disinfectants, or to indicate how they should be used, we therefore select **boracic acid** as being a useful and safe disinfectant for the general treatment of wounds.

Boracic acid is usually sold in the form of a light white powder, which, when rubbed on the skin, gives a smooth silky feeling. It is soluble to the extent of $\frac{3}{4}$ oz. to the pint of *cold* water, and 6 oz. to the pint of *boiling* water. It may be used pure as a powder, to be rubbed on the skin around a wound, or to soothe irritated surfaces.

As a lotion: 55 (*i.e.* rather more than half an ounce) to the pint of water for washing out wounds and bathing inflamed surfaces.

As an ointment: 51 to the ounce of lanoline or vaseline for dressing burns and sores.

As a dressing: lint or clean linen rag may be dipped in a boiling solution containing 6 oz. to the pint of water, hung up to dry, and then carefully rolled up and kept free from dust until wanted.

The use of heat.—In the absence of any disinfecting solution we may use water *which has been thoroughly boiled* and one teaspoonful of common table salt added to every pint, for washing out a wound. The old-fashioned *scorched linen rag* may be used in the absence of other dressing. Scissors and other metal instruments should be scrubbed with a nail-brush and hot soda and water, and then *boiled for five minutes*.

Soap and water.—Before touching a wound or disturbing a dressing the sleeves should be tucked up, and the hands and wrists thoroughly scrubbed with a nail-brush, soap, and hot water; particular attention being given to the nails and the grooves between the folds of skin. The hands must then be dried with a clean towel, and thoroughly rinsed with boracic solution. The wound should then be exposed, protected with some clean dressing, and the parts around thoroughly washed with soap and water, and then bathed with boracic solution.

General Directions as to how to Dress a Wound

Severe bleeding brooks of no delay, and must be arrested as promptly as possible. This having been done, place the patient in a convenient position, and collect the necessary

dressings and appliances, or whatever you can use instead, if they are not at hand; these are:—

1. Hot water.
2. Some basins or flat dishes. A douche-can, if handy.
3. Clean towels.
4. Soap and a nail-brush.
5. Scissors. Forceps or tweezers.
6. Boracic powder, if handy.
7. Boracic solution, or boiled water.
8. Boracic lint or scorched linen rag.
9. Absorbent cotton wool or clean linen.
10. A bandage, handkerchiefs, or long strips of linen.

Now wash your hands, and scald out the basins. Fill the douche-can or a basin and a flat dish with boracic solution or boiled water. Clean the scissors and forceps, and place them in the boracic solution or boiled water in the flat dish. Soak some pledgets of cotton wool or pieces of rag in the solution to use as sponges. *On no account use ordinary toilet sponges.* Spread out a clean towel, and on it lay whatever you intend to use as dressing, and cut it out the size and shape you think necessary. It should, if possible, extend at least three inches in all directions beyond the edges of the wound, and consist of four layers of lint, and a rather larger pad of wool to lie over it. Place a temporary dressing on the wound, to prevent the entry of soap and water, whilst you thoroughly wash the skin all round and cut any hair quite short. Dry the skin you have washed, remove the temporary dressing, and wash out the wound by allowing the solution to run from the douche-can or by squeezing the cotton wool or rags, which have been in soak, over it. Pick out any splinters, dirt, or grit you can see in the wound, dry the surrounding skin with the soaked cotton wool squeezed out as dry as possible, and bring the edges of the wound together the best way you can; dust the surrounding skin with boracic powder, and now put on the dressing. A first dressing is usually more comfortable if put on moist, and if you have boracic lint or lotion, dip it in, squeeze it out as dry as possible, and lay it evenly over the wound. If the bleeding is rather free, or you have no dressing except the scorched linen rag, apply it *without wetting it*.

The dressing should then be secured by a *firm* but *not tight* bandage or handkerchief, and the limb, if an arm, placed in a sling, if a leg, elevated on pillows.

Bleeding or Hæmorrhage, and how to arrest it

When the tissues are cut or lacerated, blood escapes from the capillaries, veins, or arteries, or from all three. In *capillary* bleeding, red blood trickles from the wound. In *venous* bleeding, there is a steady flow of dark purple blood. In *arterial* bleeding, bright red blood pours out in spurting jets. Nature endeavours to arrest bleeding, and is successful in the majority of cases, by the following means: (1) By the clotting of the blood; (2) by the injured person becoming faint, and the force of the circulation being diminished or temporarily arrested; (3) by the tendency the elastic arteries have to retract into the tissues and so become compressed, and of their muscular coats to contract and the orifice to diminish in size and become plugged, when divided. For this reason an artery partially divided causes more dangerous hæmorrhage than when it is completely severed. However, it does not do to trust to Nature to stop the bleeding from an artery, and prompt aid must be rendered to a man suffering from a wound from which bright blood is spurting. Some courage and very little knowledge will enable anyone to arrest the bleeding temporarily, but the permanent arrest may baffle the most skilled surgeon.

Arterial Hæmorrhage. To arrest temporarily:

1. *Direct pressure on the bleeding point in the wound.*—This is by far the most prompt and effectual method we know. In all cases of severe bleeding, bare the wound of clothes and place the finger firmly on any spouting vessel. If the finger is placed directly on the mouth of a bleeding artery it requires very slight pressure and gives but little pain; the hæmorrhage is stopped, and all danger for the time averted.

2. *Plugging the wound.*—A strip of linen, a handkerchief, or a necktie may be plugged into the wound, some hard object, such as a cork or a stone, placed over the plug, and a handkerchief tied firmly round to keep the whole in place.

3. *Constriction of the limb above the wound by means of a*

tourniquet.—This may be applied round the upper arm or thigh to arrest bleeding at any lower point in the limb. Remember that the arteries of the forearm and leg are situated so deeply, and so much protected by the bones, that they can with difficulty be compressed by a tourniquet, and for hæmorrhage from the hand or wrist it must be placed round the upper arm, and from the foot or leg round the thigh.

For a tourniquet to be effectual it must be very tightly applied, so as to completely arrest the circulation in the limb. It may be done in the following way. Pass a handkerchief, thick piece of string, or a strap round the limb and knot it firmly, push a short stick or a similar implement under it, and twist it round and round until it becomes quite tight. It must be kept twisted until some means of dealing with the wounded artery are found. *A wound must not be kept plugged, or a tourniquet left constricting a limb, for more than twenty-four hours.* The plug will cause the tissues to slough, and mortification or gangrene may be caused by the tourniquet, if either are used too long.

4. *Compression of the artery at a point above the wound*.—This is done by pressing the artery with the fingers against the adjacent bone. The points where the arteries may be compressed are shown in figs. 10, 12, and 13. The advantage of this method is, that it is much less painful than compression of the artery and complete arrest of the circulation by a tourniquet; but it is far more difficult to execute, and requires some coolness, skill, and knowledge of anatomy. It is well to practise compressing the arteries at the points indicated in the figures, as by so doing you may be of great help to a surgeon called to treat a case of arterial hæmorrhage.

The *permanent arrest* of arterial bleeding should not be attempted by an unskilled person, unless it is impossible to obtain the services of a surgeon. However, surgeons are not always within reach, and it may fall to the lot of an unskilled person to be compelled to make the attempt.

The tourniquet being applied, or the artery leading to the wound compressed, all the blood clot is carefully washed out. Search is now made for the wounded artery. If it is completely divided the cut end may be seen somewhat embedded in the

tissues, looking like a little white ring containing clot. This should be seized with forceps or tweezers and pulled slightly out whilst a ligature is tied tightly round. Search is then made for the further cut end on the opposite side of the wound, which should also be tied. Having secured the artery, or having failed to find it, the tourniquet should be cautiously loosened, or pressure released, from the artery. Watch for any spurt of blood, and if it occur, the spot must be marked and the tourniquet immediately tightened up again, whilst search is made for the wounded vessel at the spot whence the blood came. Having secured this, the tourniquet should be again relaxed and the limb elevated whilst the wound is carefully watched for any further spurts of blood. If an artery is found to be punctured, or partially divided, it should be picked up and completely cut across and both ends tied. Life has been saved, in the absence of other instruments and ligatures, by cauterising the cut end of an artery by some metal instrument, such as a ramrod heated to a dull-red heat.

There are many other methods of arresting arterial hæmorrhage, mostly difficult to execute or hard to remember on the spur of the moment. When a large artery is spouting there is no time to refer to books; the limb is usually covered with clothes, the landmarks of the artery above the wound are concealed, and there is no time to be lost in fumbling about trying to find and compress the vessel. Therefore, we repeat, *put your finger at once on the bleeding point and keep it there.* The hæmorrhage is now controlled, and don't be in a hurry. You have plenty of time to think what you can best use as a tourniquet. One hand is engaged with the wound, but with the other you can get at a handkerchief or remove a belt, or braces. Handkerchiefs can be knotted together with one hand and the teeth. Next think what can be used as a twister; a stick, pocket-knife, a large key, or the stem of a briar pipe. Pass the ligature round the limb, bringing the two ends above and ready to knot together, and have the twisting rod at hand. Now let go the wound, tie the ligature tightly, push the twisting rod under, and screw it up tight. Preparations for plugging a wound may be made in the same way. Having temporarily arrested the bleeding, convey the patient home and send for a surgeon. Before he arrives get the hot water, basins, dishes, &c., ready for

the instruments he will use to tie the artery, and for dressing the wound afterwards.

Venous hæmorrhage is readily arrested by *elevating* the limb, and putting a pad on the wound with a moderate degree of pressure. The limb should be evenly bandaged *below* the wound, but there must be no constriction *above*. The flow of blood in the veins is much more easily arrested than in the arteries, and a tight bandage above the wound, if it does not completely stop the circulation in the arteries, prevents the return of blood in the veins, and the limb becomes engorged with blood. Surgeons are often called to cases of severe venous hæmorrhage, and find a tourniquet partially constricting the limb above the wound; the bleeding usually ceases immediately the limb is elevated, and the tourniquet removed.

In cases of bleeding from the veins in the *neck*, the wound must be plugged, and a bandage applied to keep it in place, but not tight enough to constrict the neck.

Varicose veins of the leg sometimes ulcerate, and bleed profusely. The patient should immediately lie down, and keep the leg raised, whilst a pad is being arranged on the wound. If he endeavours to run or walk any distance, seeking for help, he will, in all probability, faint on the way from loss of blood. He is perfectly safe if lying down with the leg raised.

Capillary hæmorrhage may usually be stopped by *gentle pressure*, and elevating the limb. If the oozing from a wound is rather free, and soaks through the dressing soon after it has been applied, the wound should be uncovered, and syringed out or bathed with *hot* water, as hot as can be borne by the hand, *i.e.*, about 120° F. The dangerous hæmorrhage which characterises the disease known as hæmophilia (see BLEEDERS, and HÆMOPHILIA) is usually uninfluenced by any form of treatment, but absolute rest, elevation of the part, gentle pressure, and cold applications should be tried.

There are certain remedies sometimes used to stop bleeding, which are called 'styptics'—the salts of iron, tannic and gallic acid, zinc, lead, alum, and 'Friar's Balsam' (compound tincture of benzoin) being the chief. They are usually ineffective, injurious to the healing of a wound, and are best avoided. 'Friar's

Balsam' is perhaps the least offensive, and a fine-pointed crystal of alum is sometimes of use to stop the annoying bleeding from a chin which has been cut when being shaved.

Closing a wound may be effected by adhesive plaster, or by sewing it up.

Plasters are made of various materials, but by far the best for the purpose of bringing together the edges of a wound is 'rubber adhesive plaster' (Mead's); before applying it, the surface of the skin must be thoroughly dried, and the hair either shaved or cut quite short. It sticks very firmly if properly applied, and causes great pain when being removed from a hairy surface. Whatever plaster is used, it *must not cover* the whole of the wound, but apertures must be left for the escape of any discharge. If discharges collect in a wound so completely closed that escape is impossible, suppuration is very likely to occur. The wound may be closed by narrow strips passing across from the skin on one side to the other, with intervals

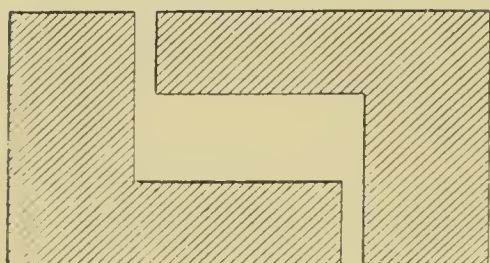
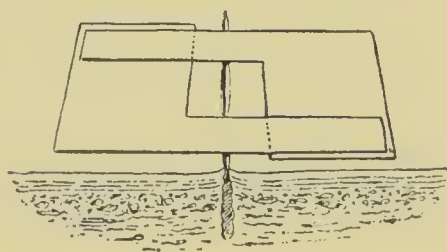


FIG. 45.—L-SHAPED PLASTER.



The same applied to a wound. The wound in the skin and subcutaneous tissues is shown below in section.

left between, or by one of the following methods, which may be understood by referring to the annexed figures.

Fig. 45.—Two L-shaped pieces of plaster are cut, one limb being much broader than the other. The two pieces of plaster are then placed one on each side of the wound, a short distance from the edge, and the broad limbs made to adhere firmly. When this has taken place, the narrow limbs, which have been kept off the skin until now, are drawn gently and evenly across the wound,

which is thus closed, and laid down, and made to adhere to the plaster on the opposite side.

Fig. 46.—An oblong piece of plaster is cut, and elongated apertures made in it; this is termed 'windowed' plaster. Two strips of lint are then rolled up tightly, and cut the same length

as the wound. One end of the plaster is then stuck to the skin on one side, and a roll placed on each side of the wound; the edges are then compressed together, and the plaster brought over the rolls of lint, and made to adhere to the skin on the opposite side. This requires a little skill to carry out effectually, but it has advantages over the other methods. The rolls of lint not only keep the edges of the skin together, but, by pressing on the surrounding skin, keep the deeper surfaces of the wound together, and thus help to prevent blood or inflammatory exudation from collecting. They also keep the plaster from touching the wound, and prevent any irritation it might set up.

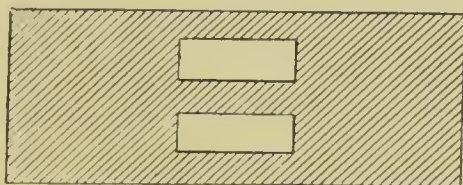
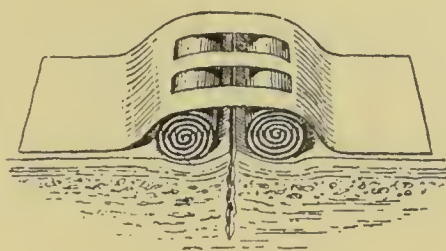


FIG. 46.--'WINDOWED' PLASTER.

The same applied over two rolls of lint.
The wound shown as in fig. 45.

Sewing up or '*suturing*' a wound is by far the most satisfactory way of bringing the edges together, and though a needle being repeatedly thrust through the skin is a painful proceeding, it should be submitted to, when advised by a surgeon, in preference to other methods. It may be done in the following way. A sharp triangular-pointed glover's needle, or a half-curved surgical needle, with a suture of silk, horsehair, prepared cat-gut, silkworm gut as used by anglers, or silver wire is used. The edge of the wound is steadied, and the needle, threaded with the suture, is thrust through the whole thickness of the skin, about one-third of an inch from the edge of the wound, and brought out on its raw surface; it is then carried across the wound, and thrust through the raw surface, and brought out through the skin at a point exactly opposite the puncture on the other side. The suture is then tied with a 'reef-knot,' just tight enough to bring the edges together without puckering the skin; the knot should be drawn to one side, so as not to rest on and injure the edges of the wound. One or more stitches may be necessary, each one being knotted separately.

Fig. 47 shows a wound being closed by three sutures.

Fig. 48 shows the difference between a 'reef' and a 'granny' knot. The reef knot should always be used, as it never slips. whilst the 'granny' is quite untrustworthy.

After the sutures have been inserted and tied, the skin edges should be in accurate contact, but it is better that they

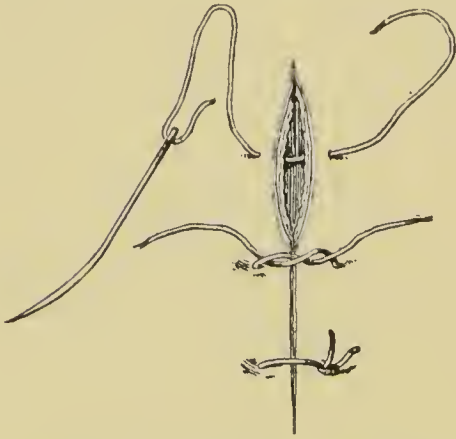


FIG. 47.—SUTURING A WOUND.

A wound with three stitches. The lower stitch is completed, the knot tied and drawn to one side. The middle stitch is in place, but only the first knot of the 'reef-knot' has been tied. The upper stitch shows the needle carrying the suture, passing through the edges of the wound.

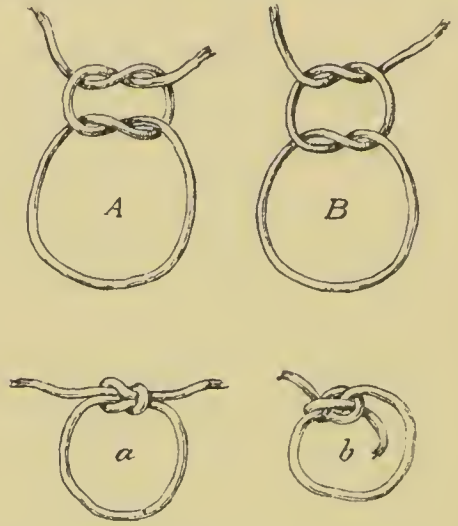


FIG. 48.—"REEF" AND "GRANNY" KNOTS.

A. Reef-knot being tied.
a. The same drawn tight.
B. 'Granny-knot' being tied.
b. The same drawn tight.

should pout outwards rather than be turned in. There is a natural tendency for them to turn in; but this prevents union, and when they are found to be so, the edges should be gently turned out by means of forceps or a probe.

Dressing for wounds.—The cleansing and application of the first dressing to a wound have already been described, but some description of various forms of dressing must be added. Many applications were used in bygone days, and many quack remedies are now sold, to make wounds heal. Science and experience have taught us that the rational way of treating a wound is to clean it, keep it clean, and protect it from all kinds of irritation. An ideal dressing for a wound is some light material which excludes the air, is capable of absorbing any discharges, and, if possible, contains some disinfectant which prevents putrefaction without irritating the wound or surrounding skin. Materials which contain disinfectants, such as boracic lint, are

‘antiseptic’ (preventive against putrefaction), boiled water and clean linen scorched by the fire are ‘aseptic’ (incapable of producing putrefaction), dirty rags, cobwebs, and other abominations often applied to wounds are usually ‘septic’ (productive of putrefaction). Poultices cannot be recommended as an application for wounds, unless the water contains some disinfectant; however clean a poultice may be when first applied, the warmth and moisture, and the sodden condition produced in the skin around the wound, all tend to produce the most favourable soil for the cultivation of microbes.

Every time a wound is dressed the healing process is slightly disturbed; therefore, as a broad principle, the less often wounds are dressed the better. There are many exceptions to this rule, such as, when a wound becomes inflamed, when there is profuse discharge, and when there are portions of dead skin or other tissue to separate and come away.

Antiseptic dressings need not be changed so often as aseptic dressings, as the discharges absorbed by them do not undergo putrefaction, unless the whole thickness becomes soaked through. The dressing most commonly used by surgeons at the present time consists of gauze soaked in a solution of mercury and zinc, and then dried; it is called ‘double-cyanide gauze,’ and is non-irritating, and very absorbent. Severe wounds dressed with this are often left untouched for a week or ten days, and when examined are found to be absolutely healed, and the blood-stained discharge which has soaked into the dressing quite sweet. Boracic acid is not such an active antiseptic as mercury, and a first dressing of boracic lint should be changed at the end of twenty-four hours. If the oozing from the wound has ceased, and there is but little pain and redness, a dressing may be put on and left untouched for three days; meanwhile, the temperature must be taken night and morning, and if there is fever or complaint of throbbing pain, the wound must be re-dressed.

Whatever dressing is used, a layer of absorbent wool should be laid over it to exclude the air, absorb discharges, and act as a protective pad. Chemists often supply ‘medicated’ instead of absorbent wool; this is unsuitable for the purpose of dressing wounds, as it will not absorb discharges, or only to a limited extent. The two wools are easily distinguished; a flake of absorbent wool, thrown into some water, sinks immediately like

a snowflake; medicated wool floats for some seconds, if it sinks at all; absorbent wool, grasped firmly in the hand, gives a crisp sensation as it is compressed, whilst the other feels soft. A most convenient form of wool for dressings, and soaking for sponges, is 'gamgee tissue': this consists of absorbent wool in sheets, between two layers of fine muslin; it is invaluable in the sick-room for many purposes. It contains no disinfectant, and is, therefore, not antiseptic; but if kept in tin boxes and uncontaminated by dust, it should be aseptic, and may be applied in the dry condition directly to a wound, though it is safer to soak it in some disinfecting solution first.

The following are useful forms of dressings which may be used for various conditions:—

1. *Dry dressings* are preferable to wet applications in the absence of any antiseptic fluid. Boracic lint, gamgee tissue, clean or scorched linen rag may be used. They should extend three inches beyond the margins of the wound, and consist of at least three layers of lint covered with a pad, rather larger in circumference, of absorbent wool. They are especially suitable for recently inflicted incised wounds. They stick to the wound, and require to be thoroughly soaked with boiled water or disinfecting solution, in order not to disturb the edges of the wound, when being removed.

2. *Moist dressings*.—The same materials soaked in some disinfecting solution (boracic, Condy's fluid, iodine, or carbolic lotion—see Appendix), and wrung out as dry as possible, and dry wool placed over them. They should be the same size as dry dressings, and the same care taken in removing them. They are useful in most varieties of wounds.

3. *Wet dressings*, i.e., moist dressings, kept from becoming dry by placing a layer of oil-silk or gutta-percha tissue over them. The lint should be cut rather larger than the wound, dipped in disinfecting solution, wrung out, and spread over the wound. Over this is placed the waterproof tissue, cut rather larger, so as to completely cover and extend about one-third inch beyond the edge of the lint in all directions. Covering this, a much larger layer of wool is placed, extending well beyond the margins of the waterproof tissue. They are useful for wounds that look angry, and threaten to suppurate, and for those that have failed to unite, and are presenting a granu-

lating surface. They must be changed frequently, usually twice in the twenty-four hours.

4. *Fomentations* are similar to the above, being moist dressings enveloped in waterproof tissue and wool, but they should cover a larger surface, be applied as hot as the patient can bear them, and be changed every three or four hours at least. They take the place of the old-fashioned poultice, and are used for poisoned wounds and lacerated, contused wounds, with much suppuration and pieces of dead tissue to come away.

5. *Oily dressings*.—Lint soaked in carbolic oil (olive oil, 33 parts, carbolic acid, 1 part) is a handy application for a first dressing to incised wounds. It excludes the air, and is quickly changed, as it does not stick, but it possesses no power of absorbing discharges, and is not suitable for suppurating wounds. For burns and scalds a mixture (of equal quantities of lime-water and linseed oil) called 'carron oil' is used to soak lint and rags. This excludes the air, and is a soothing application extensively used in ironworks, but it is not antiseptic, and must be changed at least every other day (see BURNS AND SCALDS).

6. *Ointments* are used to granulating surfaces over which the skin is forming. Boracic or zinc ointment is most commonly used. The ointment should be evenly and thinly spread on lint, and a piece cut the *exact* size of the part of the wound left unhealed; over this a pad of wool extending well beyond the margins of the wound should be laid. The dressing should be changed daily.

Special Treatment of the Various Forms of Wounds

Abrasion or graze.—Wash, and protect from the air. Apply a dry or moist dressing (see SORE HEEL).

Incised wounds.—If inflicted with a clean instrument, and seen soon after the injury, before any dirt has got in, do not disturb the parts by washing them, but bring the edges together, and apply a dry or moist dressing for twenty-four hours. On removing the dressing, if the edges are found to be covered with a clot or scab glueing them together, and there is no pain or angry look in the surrounding tissues, leave the scab undisturbed,

apply a dry dressing, and keep the part at rest. If the surrounding skin looks angry, remove the scab, soaking it off gently, and apply a moist dressing. Take the temperature, and watch for signs of fever, or the occurrence of throbbing pain, when a wet dressing or fomentation may be required. If inflicted with a dirty instrument, allow the wound to bleed, and bathe with warm antiseptic solution. Do not bring the edges together too accurately, and apply a wet dressing. If no inflammation sets in at the end of forty-eight hours, the edges may be brought into closer contact, and a moist dressing applied. Foment if suppuration occur.

Punctured wounds.—Remove any splinters, fragments of glass, or other foreign bodies. Encourage bleeding by tying a handkerchief round the limb above the wound for a few minutes, or the wound may be sucked. Make no attempt to close the aperture in the skin. Apply a moist or wet dressing, and keep the part at absolute rest.

Contused and lacerated wounds.—It is seldom advisable to attempt to close these wounds. A blunt instrument may sometimes split the skin, causing a contusion at one part, and an irregular but clean division of the tissues leading off from it; the cleanly divided edges may be brought together. When the injury has been inflicted by machinery, or by the teeth or claws of a large animal, the wound should be treated in the following way:—If possible, the limb should be placed in a bath, or the part be freely doused with warm antiseptic solution or boiled water for several hours. If the patient has to be moved, he should be carried, and the injured limb supported on pillows or rolled-up cloaks, or rugs, and kept at absolute rest. The limb should be enveloped in fomentations, kept constantly wet by frequent douching with cold if it is impossible to get hot solutions. The help of a surgeon must be obtained as soon as possible, and if the patient is being conveyed to a town, a messenger should be sent on, so that all may be in readiness. Severe inflammation and profuse suppuration frequently follow these injuries, and every care must be taken that there shall be free escape of the discharges. When a bath is unobtainable, covering the limb with only one layer of dressing, and keeping

it saturated by constantly dripping antiseptic solution over it, often give excellent results. Dripping water may be managed either by partially compressing the tube of a douche-can, or an india-rubber tube, or a skein of worsted may be arranged so as to syphon the fluid from a jug or large can, and flow on the injured part. After the dead skin and other tissues have been cast off as sloughs, the granulating surfaces may be dressed with wet dressing or ointments.

Inflamed and suppurating wounds.—Clean-cut wounds properly dressed and kept at rest usually cause wonderfully little pain; there is some smarting at the time of injury, followed by dull aching for a few hours, but if this is succeeded by throbbing pain, suppuration is probably occurring.

When the tissues around a wound which has become sealed up with blood-clot or closed by means of stitches or plaster look angry and are the seat of throbbing pain, some discharge is probably pent up which must be released immediately. Without doing this it is useless to give medicines and attempt to treat the fever by other means. If the wound has been recently inflicted, even after seven days, the edges are only glued together, and can be painlessly separated with some fine, blunt instrument, such as a thoroughly clean bodkin, the blunt end of a large needle, or a probe inserted between the stitches or strips of plaster. Some fluid will probably well out, clear serum, partially clotted blood, or pus. The release of blood or serum will probably be followed by cessation of the pain, and a moist dressing being applied, all will go well. If the pain does not cease or it is pus that escapes, the nearest stitch or strip of plaster must be divided and a fine strip of lint dipped in antiseptic solution be inserted and left in the wound so as to keep the edges apart, but not block the opening (fig. 49); a wet dressing should then be applied. If the symptoms of inflammation and suppuration continue, remove all the stitches or plaster, strip the wound open, wash it out thoroughly,



FIG. 49.—INFLAMED AND SUPPURATING WOUNDS.

A wound with the central stitch removed and a strip of lint inserted to keep the edges apart, and allow the escape of discharge.

and apply hot fomentations. The wound must now remain open and heal by granulations, and as the inflammation subsides and healing begins, the edges must be prevented from uniting until the granulations grow and fill the wound up from the bottom. To effect this a narrow strip of lint should be lightly packed,

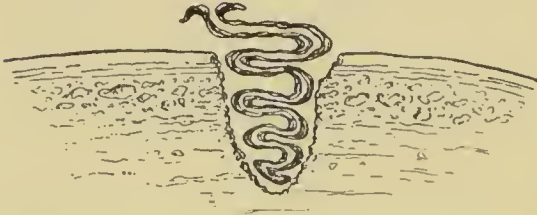


FIG. 50.—INFLAMED AND SUPPURATING WOUNDS.

A wound, seen in section, freely opened and packed with a strip of lint so as to keep the edges from uniting until healing has taken place from the bottom of the wound.

not plugged, into the wound so as to fill its cavity from the bottom to the top (fig. 50), and a wet dressing of antiseptic lotion placed over it and changed twice a day. As the wound gradually heals, if the granulations grow above the level of the skin, and instead

of being small and rosy become large and pale pink, forming 'proud flesh,' they should be lightly touched with solid nitrate of silver, or a crystal of alum, and then dressed with zinc lotion. When they have retreated to a proper level and the skin is beginning to form over them at the edges of the wound, a dressing of zinc or boracic ointment, the exact size of the granulating surface, may be applied and renewed daily.

Constitutional Treatment of Wounds

If collapsed or suffering from shock, this condition must first be treated as already described (p. 182). If a large vessel has been injured, stimulants must be given with caution, lest, by increasing the force of the circulation, imperfectly formed clots should be disturbed and bleeding break out afresh. If large quantities of blood have been lost and the patient is restless, tossing himself about, with difficulty of breathing, and complaining of being unable to see, or of rushing noises in his ears, the legs should be firmly bandaged from the toes up to the groins, and the foot of the bed raised so that the patient's feet are on a higher level than the head. He may drink freely of any non-alcoholic fluid, but he should not have an unlimited quantity of iced water, as it may cause vomiting. If unable to swallow, a pint of warm water with one teaspoonful of common salt may be gently injected into the bowel and repeated every hour until he rallies. If the patient is young and usually

robust, he should be kept on fluid diet during the stage of reaction and for the next three days, but old and feeble people must not be kept too low, and simple diet with some stimulant suits them better. It is well to give an aperient on the second day—calomel, 3 grs., for a full-blooded adult, a seidlitz powder or sulphate of magnesia, 60 grs., for the less vigorous, and rhubarb and soda, 10 grs., or castor oil, 2 teaspoonfuls, for a child. These are particularly indicated if there is fever present, and fluid or slop diet should be given until the temperature falls. Stimulants and a generous diet are required when there are sloughs to come away attended with much discharge, and a tonic of quinine and iron may be given with advantage both now and when the surfaces are granulating.

BURNS AND SCALDS

Burns and scalds not only damage the tissues locally, but may cause profound constitutional disturbance. The degree of local damage depends on the intensity of the heat, and the duration of the exposure of the tissues. There may be simply reddening of the skin, or the skin may be blistered, which is so often seen after a scald; or the skin may be partially or wholly destroyed, and even the whole limb charred by burns. Scalds commonly affect large areas, but burns destroy the tissues to a greater depth. The constitutional disturbance and risk to life attending these injuries depend on the extent of surface affected, rather than the depth of tissue destroyed. They are far more dangerous to children than adults, especially when the head, face or chest is the part injured.

The dangers attending a burn or scald are (1) Shock. (2) Inflammatory affections, especially pneumonia, following the reactionary stage. (3) Exhaustion due to the suppuration attending the separation of destroyed tissues. (4) Fever and forms of blood poisoning due to the infection of the discharges. (5) Deformities due to contraction of the scars after healing has taken place.

When a person's clothing is on fire he should be laid on the floor, and a coat, rug, mat, blanket, or tablecloth wrapped round him, and pressed firmly on the burning parts so as to smother the flame. If a person is alone and catches fire, he

should not rush to the door in search of help, but throw himself on to the floor and roll over, and if a hearthrug or mat is at hand wrap it round the burning dress. Running about for help fans the flames, which mount up and burn the more vital parts, face, neck, and chest.

Treatment.—The cardinal points are—

1. To remove the clothes by cutting them off, and take the greatest care not to pull them and any damaged skin off the parts where they happen to stick.

2. Protect the damaged parts from exposure to the air with some temporary dressing.

3. Treat the shock.

4. Apply a dressing which will require *changing as seldom as possible*.

The readiest means of excluding the air are to dust the parts thickly with flour, starch, ground-rice, or toilet powder; or to dip handkerchiefs in olive, linseed, castor, or carron oil; or handkerchiefs may be smeared with boracic ointment, vaseline, or even lard, and applied to the injured parts.

If the shock is severe cover the patient with blankets, place hot bottles to the feet, and give stimulants largely diluted with warm water. If there is much pain give opium in some form—tincture of opium $\text{m}10$, or chlorodyne $\text{m}15$, or Dover's powder grs. 5 for an adult. For a child over 3 and under 12 years of age, tinct. opi. $\text{m}3$, or chlorodyne $\text{m}5$, or Dover's powder grs. 2. Opium is best avoided for infants and very young children, but bromide of potassium, grs. 2 for every year of age may be given instead.

If a bath large enough to admit the patient lying full length is obtainable, it should be got ready, the water at a temperature of 100° F., and if possible boracic acid, 4 oz. or Condy's fluid just sufficient to tinge the water should be added. It soothes the pain, soaks off adherent clothing, cleanses the surface, and prepares the skin for a dressing which may be allowed to remain on for several days. This dressing may be prepared whilst the patient is in the bath. Lint or linen spread with boracic ointment sufficient to cover the whole of the damaged surface, and a thick layer of absorbent wool or gamgee tissue laid over it and bandaged on, need not be

changed for four days, and if the patient is comfortable, with little fever, and the discharges have not soaked through the dressing, it may be left on for a week.

When the skin is not broken, but only reddened, protecting it from the air is sufficient, and carron oil makes an excellent application. If there is blistering, the blebs should be snipped with scissors, or pricked, to allow the fluid they contain to escape, but the skin should on no account be removed. They may then be dressed with boracic ointment and absorbent wool.

If melted lead, sealing-wax, or hot pitch falls on and adheres to the skin, do not be in a hurry to pull it off. A blister will certainly form under the substance, which can be pricked at its margin and the fluid allowed to escape; cover the parts with boracic ointment and wool, and allow the adhering substance to come away naturally.

In the later stages of the healing of burns, wet dressings of boracic lotion may be used to hasten the separation of sloughs and the formation of granulations. There is a marked tendency for the granulations to be large and pale, forming 'proud flesh,' and they may require touching with nitrate of silver (see *ULCERS*, p. 229).

The diet, in severe cases, must be fluid for the first week, but it should be liberally supplied and stimulants given to weakly subjects. During the separation of sloughs and during convalescence, tonics of quinine and iron are required. Intestinal irritation is not an uncommon complication of these injuries, hence the care in feeding during the early days; this condition, pneumonia, meningitis, and the various forms of blood poisoning are treated under their special headings.

CHAPTER IV

DISEASES ATTENDED WITH SUPPURATION

Abscesses—Boils—Carbuncles—Ulcers—Bed Sores, Splint Sores,
Sore Heel—Whitlow.

ABSCESSSES

AN abscess is a collection of pus or 'matter,' the result of inflammation, acute or chronic. The causes of inflammation and the changes which occur in tissues leading to the formation of pus have already been described (see INFLAMMATION, p. 91).

Acute abscesses.—*Symptoms.*—Pain, swelling, heat and redness. If the pus is near the surface and in any quantity, 'fluctuation' may be detected (see SUPPURATION OF WOUNDS, p. 204), and if it is not let out by an incision, the skin over the centre of the abscess forms a conical projection, becomes dusky red or bluish; finally a white point appears and the pus escapes.

Treatment.—When inflammation of any part is noticed it should be kept at rest and cold applications used. If the pain and swelling increase the parts may be painted with belladonna and glycerine, and hot fomentations or poultices, if the skin has not broken, applied. A surgeon should invariably be called to treat an abscess, as a timely incision immediately relieves the pain, usually prevents extension of the inflammation, hastens the healing, and leaves very little scar. When the pus is allowed to collect in sufficient quantity to cause death of the skin, the white point may be pricked with a needle (previously cleansed by passing it through the flame of a spirit lamp or candle) and hot fomentations of boracic or Condy's fluid applied. The opening must not be allowed to close until the abscess has ceased to discharge; if this is not attended to the abscess may continue to discharge almost indefinitely, the opening closing

for a few days and then discharging again, and the abscess cavity becoming larger until the whole area of skin over it perishes, and an ulcer remains.

Chronic or cold abscesses may be the result of an ill-treated acute abscess, or may form in people whose general health is affected, particularly in tuberculous or strumous individuals.

Symptoms.—They often form without any acute pain or signs of inflammation; dull aching discomfort may be present, and the overlying skin become a dusky red colour. A gradually and slowly forming swelling, and finally fluctuation, may be the only symptoms.

Treatment.—Constitutional treatment and sea air are of use. Poultices and painting with iodine are to be condemned. If the abscess is discharging, dry antiseptic dressings should be used, but no treatment is satisfactory unless the contents of the abscess are thoroughly evacuated, which can only be done by a surgeon.

BOILS

A boil is a small abscess occurring in the substance of the skin, usually around the root of a hair. It begins as a small pimple, which at first itches, then throbs or burns, as it increases in size. The inflammation may subside and the boil disappear (*blind boil*), but usually the skin points and breaks, and in a few days a small slough, the ‘core,’ comes away, and the inflammation rapidly subsides and the sore heals. Boils often occur in crops, one forming after the other has healed, or several may form round the site of the original one. They often appear in people who seem healthy in every other way, but some defect in general health or diet must be suspected; bad drainage and impure water are common causes. Parts of the body irritated by the clothing, such as the neck by a stiff collar, or otherwise chafed, as the buttocks of a rowing-man, are commonly affected.

Treatment.—Moist applications, particularly poultices, are best avoided, as they favour the formation of other boils. When one is forming, painting it with tincture of iodine, three times a day, may cause it to disappear. If this fails and the boil is evidently coming to a head, cut a circular piece of strapping

one inch in diameter, with a hole in the centre the size of the boil. Stick the strapping on to the skin, with the boil projecting through the opening, and puncture it with a clean needle. Dust it with boracic powder and cover it with absorbent wool; change the wool frequently. When the slough has come away, dress the little sore with boracic ointment, but the strapping may be left on until it has healed. Saline aperients are of use to young, full-blooded patients, and iron to the anæmic. Half a wineglassful of fresh yeast, taken night and morning, often acts like a charm in stopping the formation of fresh crops of boils; how it acts is quite unknown. Change of air usually succeeds, the boils ceasing when the person who lives by the sea goes inland, and *vice versa*.

CARBUNCLES ¹

A carbuncle is an inflammation commencing in the fibrous tissue beneath the skin. The affected tissue dies and forms a slough, and the overlying skin becomes inflamed, and ulcerates, and the pus wells out of several openings. The openings enlarge, and finally the slough separates and comes away.

A carbuncle usually begins as a hard, flat, inflammatory swelling attended with itching, or burning pain, and fever. The skin over it feels thickened and indurated, and is at first red, then purple, and finally the openings form. The inflammation has a tendency to spread, and a carbuncle which is at first the size of a florin, may extend until an area the size of the palm of the hand, or even larger, may be affected. They are most common in people who have passed middle age, and are strong evidence of lowered vitality. Persons suffering from gout, kidney disease, or diabetes are particularly liable to them.

Treatment.—The diet must be simple but nourishing; milk should be taken freely; hot spiced food and salt meats should be avoided. Alcohol should be given with the food, but overstimulation must be guarded against. The bowels must be kept open with salines, opium may be given to relieve the pain unless the kidneys are diseased, and iron in full doses is useful.

¹ A carbuncle used formerly to be spoken of as Anthrax. This term is now applied to Malignant Pustule. See MALIGNANT PUSTULE, ANTHRAX, OR 'WOOL-SORTERS' DISEASE.

Painting the surface with tincture of iodine, three times a day, hastens the formation of the openings in the skin, but if the pain is severe, painting with belladonna and glycerine, and hot compresses of dry wool, give more relief.

Hot fomentations are best avoided, as they encourage the formation of boils. When the openings form, they may be enlarged by inserting the point of a stick of nitrate of silver daily, and the nozzle of a fine syringe may be inserted, and boracic solution or weak iodine solution injected. A wet dressing of boracic lint, the exact size of the swelling, may now be applied, covered with cotton wool, and changed frequently. When the sloughs have come away and the discharge has diminished, a boracic ointment dressing may be used.

ULCERS

Ulcers are open sores due to destruction of the skin or mucous membrane, and tend to deepen or extend by the surrounding tissues perishing in minute portions and being shed off as pus. When they begin to heal, granulations form, and gradually fill up the breach of tissue. They may be caused by wounds, burns, abscesses or boils. They may occur in people with some constitutional taint without injury or other apparent cause. They are very common on the legs of old people with feeble circulations, usually starting over the shin. Enlarged or 'varicose' veins are a common cause. There are many varieties.

1. **Simple ulcers**, caused by wounds or burns.

2. **Weak or indolent ulcers**, characterised by the granulations being large, pale, and flabby. Common in anæmic people and after scalds.

3. **Callous ulcers**.—The ulcers so often seen on the legs of old people; the edges are rigid and thickened, and the floor of the ulcer shows no inclination to form granulations.

4. **Painful or irritable ulcers** are commonly met with in parts which are difficult to keep at rest, such as the skin over joints, the lips, tongue, and at the anus. They often resemble fissures or cracks in the tissues rather than ulcers.

Treatment.—Any constitutional condition must be treated on general principles. The treatment of a *simple* ulcer is similar to that for any granulating surface: rest of the part, and the application of a dressing of boracic solution or boracic ointment. *Weak* ulcers require touching with nitrate of silver every second or third day, and zinc lotion or zinc ointment applied. Iron should be given internally. *Callos* ulcers are very obstinate to treatment; hot fomentations may be used for twenty-four hours to cleanse the surface, soften the edges, and stimulate the formation of granulations. Strips of ‘windowed’ strapping or plaster should then be applied, so as to bring the hard edges closer together, though accurate approximation is impossible, and a large gap is usually left between. An anti-septic dressing should then be placed over the strapping, and a roller bandage evenly applied from the toes up to the knee. The dressing should be changed every three days. *Painful* ulcers may be treated by keeping the part at rest, if possible, and protecting it from irritation. The floor and edges of the ulcer should be firmly rubbed with nitrate of silver to start with, and boracic ointment applied, if the ulcer is situated externally. Salt, mustard, pepper, and tobacco-smoking must be avoided if the ulcer is in the mouth, and a mouth wash of boracic solution should be used after eating. The treatment of Fissure of the Anus is separately described.

BED SORES, SPLINT SORES, SORE HEEL

If the skin is exposed to continuous pressure it becomes red, then a blister or slough may form, and an ulcer finally remains. *Bed sores* are often met with on the buttocks if the patient lies on his back or spends much time sitting up in bed, on the hips if he lies on his sides, and in wasting illnesses they may occur on the elbows, the heels, and the shoulder-blades. *Splint sores* form on the skin compressed between the splint and bony prominences. A *sore* or *blistered heel* is due to pressure or friction of a badly fitting boot.

Treatment.—Prevent their formation by frequently shifting the patient’s position, and scrupulous cleanliness. Any parts which are pressed upon should be washed night and morning with soap and water, dried, and then rubbed with spirit (brandy, whisky, or methylated spirit) and water in

equal parts, to harden the skin. If the patient cannot be moved he should lie on a water or air cushion. Splints should be well padded so as to prevent their pressing on bony points. If redness is noticed, pressure must be relieved as much as possible by cushions, and the skin painted with brandy and white of egg beaten up together in equal parts. If a blister forms, it should be pricked and dressed with a mixture of castor and carbolic oil in equal parts. If a slough forms, apply hot boracic fomentations until it has separated, and then dress the surface with boracic ointment. *Sore or blistered heels* should be prevented by wearing well-made boots for rough work, and by keeping the leather pliant with dubbing, tallow, or castor oil. The socks should be changed after a long day's work, the feet washed, and the skin hardened with spirit-lotion (brandy, whisky, or methylated spirit and water). Strong salt and water may be used. Before starting in the morning the feet should be greased with lanoline, vaseline, castor oil, tallow, or mutton-fat. A man who has once had to march with a sore heel is not particular what he uses. If chafing or blistering occurs, the condition must be treated as in bed sores. The blister may be pricked, but the skin must on no account be removed. Blistered hands from rowing, &c., should be prevented and treated by similar methods.

WHITLOW

A *whitlow* is an acute inflammation leading to the formation of pus in the fingers or thumb. They commonly arise from punctures by a needle or a splinter, or the irritation set up by a hang-nail. Owing to the rigidity of the tissues they usually cause very great pain of a throbbing character, particularly at night. The inflammation may start (1) in the deeper layers of the skin, (2) in the pad of the finger, or (3) in the sheath of the tendon. In the superficial forms the swelling is usually localised in the last joint of the finger, but when pus forms in the deep tissues the whole finger is swollen, and the palm may be affected owing to the pus burrowing along the sheath of the tendon.

Treatment.—When the skin only is affected, some tender point is usually found, and the hard skin overlying it should be shaved off, but not so deeply as to draw blood. The finger may

then be painted with belladonna and glycerine, hot fomentations applied, and the hand placed in a sling. If the inflammation does not subside, a white projecting point containing pus will be noticed about the third day; this should be snipped with the points of a pair of small scissors, or pricked with a clean needle, and the hot fomentations continued until all inflammation has subsided. A layer of dead skin will then be seen, which should be snipped away, and the tender skin beneath protected with boracic ointment dressing. The deep forms of whitlow cause intense pain until the pus is liberated. An incision usually gives the greatest relief, and the risks which attend inflammation of the tendon and its sheath are greatly diminished. Immersion of the hand and arm in hot water, and large fomentations, temporarily relieve the pain and hasten the softening of the tissues and the escape of the pus, but there is great risk of the tendon dying, and of suppuration occurring in the palm; the end phalanx of the finger may also perish. It is folly to poultice or foment a finger in this condition, if the help of a surgeon can be obtained. Whatever form of treatment is adopted, the hand and forearm must be placed in a sling and kept at rest until healing has taken place.

CHAPTER V

DISEASES ARISING FROM POISONED WOUNDS

Lymphangitis—Cellulitis—Erysipelas—Blood-poisoning : Sapræmia,
Septicæmia, Pyæmia.

THE inflammation which occurs in a wound poisoned by the entry of microbes may be limited to the immediate neighbourhood of the injury, or spread along the tissues to distant parts, and set up severe constitutional disturbance. The spreading of the inflammation depends on the nature of the poison and the resistance of the person infected.

In former days, when hospitals were commonly ill-drained, badly ventilated, and overcrowded, and wounds were dressed with poultices, spreading inflammations constantly occurred, and frequently decimated the patients, being conveyed from one to another by unclean hands and instruments. In consequence of the use of antiseptic dressings and the rigid attention now paid to general hygiene, these diseases rarely arise in hospitals at the present time. They are, however, often brought for treatment from the squalid homes of the poor, and may attack persons surrounded by every comfort if their vitality is low, and the microbes, having once gained admission, find in them a favourable soil for growth.

LYMPHANGITIS

Lymphangitis is an inflammation of the lymphatic vessels, with implication of those lymphatic glands which lie in their course.

Symptoms.—An irritated or suppurating sore, the neighbouring skin marked by red lines; enlargement of the lymphatic glands, and fever.

The condition usually arises from some inflamed wound, or a

mere scratch or prick which has been neglected, sometimes from a suppurating corn or blister.

The inflammation around the wound may be so slight as to escape notice. A patient often complains of a glandular swelling in the armpit and forgets that there is an abrasion on the knuckle, or of a lump in the groin caused by a sore on the foot which has escaped his notice.

The onset is usually attended by a sense of chilliness, often amounting to a rigor in severe cases, and is followed by fever to a variable degree. On examination a sore is found containing pus more or less pent up under the skin, and from it there are seen red, irregular, wavy lines passing for a variable distance up the limb, and sometimes extending to the enlarged lymphatic glands above. These red lines are inflamed lymphatic vessels, which may be so swollen as to feel like cords under the skin. The affected parts are usually somewhat swollen, and feel hot and tender. If the condition is not relieved the whole limb may become very greatly swollen, and suppuration occur in the lymphatic vessels and glands, and in the loose cellular tissue which lies beneath the skin and between the muscles. The condition is then called cellulitis.

Treatment.—The wound causing the trouble must first be attended to. Free vent must be given to any pus by snipping away dead skin, the sore must be thoroughly cleansed with some antiseptic solution, and hot fomentations applied. The red lines passing up the limb should be painted with belladonna and glycerine, covered with cotton wool, and lightly bandaged. An arm must be placed in a sling, a leg kept at rest, raised and supported by pillows.

The bowels should be opened by a brisk aperient, such as a seidlitz powder, and if there is much fever, quinine, grs. 5, may be given three times a day.

Lymphangitis may be, and commonly is, a mild affection if properly treated, recovery taking place in about a week; but if neglected, cellulitis may follow, or it may be the precursor of septicaemia in spite of treatment.

CELLULITIS

Cellulitis is an acute, spreading inflammation of the loose tissue which lies beneath the skin, between the muscles, and surrounds the pelvic and other organs; it is commonly attended with the formation of pus. It may follow lymphangitis or attend certain varieties of erysipelas, and may occur in women after childbirth. Its onset is usually marked by a rigor, and there is high fever, with other symptoms of severe constitutional disturbance, attended with rapid failure of strength. If a limb is affected there is much swelling, and the skin feels thickened and doughy, but soon becomes tense and hard, and there are irregular patches of redness. The neighbouring lymphatic glands become swollen and tender. There is much burning or throbbing pain. Pus rapidly forms and large areas of skin may be undermined. The skin soon ulcerates, and horribly offensive pus escapes.

Treatment.—Death from blood-poisoning and exhaustion is probable unless numerous incisions are made by a surgeon to liberate the pus. For constitutional and palliative treatment, see ERYSIPELAS.

ERYSIPELAS

Erysipelas is a spreading inflammation of the skin or mucous membranes starting from a wound or excoriated surface, attended with enlargement of the lymphatic glands of the part, and fever. It is believed by some that erysipelas can occur without any breach of surface whatever; but probably there is always a wound by which the microbes enter, though it may be so small as to altogether escape notice. It is quite possible that when the disease declares itself the minute wound has healed, and the seat of inoculation cannot be discovered. There is a popular belief that an east wind causes erysipelas, and the disease is undoubtedly prevalent in the spring. The probable explanation is, that during the winter people shut their windows for the sake of warmth, and their health suffers from want of fresh air and sunlight; when the spring comes the east wind chaps the skin and causes minute abrasions, through which the microbes, blown about with the dust, enter. Some

persons suffer from repeated attacks ; they are usually sufferers from eczema or other diseases causing excoriations in the skin.

Symptoms.—From three to seven days after inoculation of the poison there is a mild shivering fit, or a rigor, and often vomiting, followed by fever attended with much headache and aching pains in the back and limbs. The temperature may rise to 105° , but is often not above 101° or 102° . A patch of redness is then noticed around the wound, or when it occurs on the face, on the cheeks, by the side of the nostril, at the corners of the mouth, or near the lobe of the ear. These are the more common situations, but it may occur anywhere. The red patch has a sharply defined, somewhat thickened edge separating it from the surrounding healthy skin, and this well-marked margin is maintained as the disease spreads. The affected skin is red and swollen, and the seat of smarting or burning pain. Small blisters may form on the surface of the skin, and there is always thickening of the tissues beneath, amounting to enormous swelling in the looser tissues of the face, especially the eyelids. The neighbouring glands become enlarged and tender. The degree of fever is usually in proportion to the amount of surface affected, and the inflammation may spread over a very large area ; in fact there is no limit to the amount of extension, but the central part, first affected, usually becomes healthy as the disease progresses at its margins. The spreading may continue uninterruptedly, or remain stationary for a day or two and then progress, and its disappearance is usually as sudden as its commencement. In severe cases, and in weakly people, the general prostration is very marked, but recovery often takes place when the patient appears to be in a hopeless condition. Erysipelas of the mouth and throat is a very grave condition, owing to the difficulty in swallowing and breathing. These cases are often carried off by inflammation of the lungs, and sometimes from suffocation due to swelling of the mucous membrane lining the larynx.

Erysipelas may be complicated by suppuration of the tissues beneath the skin, and the condition used to be called *phlegmonous erysipelas*, but it is now generally believed that it is due to erysipelas and cellulitis existing together. (See CELLULITIS).

Treatment.—The patient should be isolated in a well-ventilated room. The poison is rendered less active by being

exposed to fresh air and sunlight, and is not easily conveyed if the hands and instruments of the attendants are thoroughly cleansed. The clothing and bedding of the patient must be disinfected. The nurse must use the utmost care in keeping any cuts or abrasions on her own person thoroughly protected.

Maintain the patient's strength by a nutritious fluid diet : severe cases must have a liberal allowance of milk, eggs, and stimulants. Give saline aperients if there is constipation. Large doses of the tincture of perchloride of iron ($\mathfrak{m}30$ in water $\mathfrak{z}1$ every four hours) are frequently given. Citrate of iron and quinine, grs. 15, may be given instead. Opium in the form of Dover's powder, grs. 5, twice a day, may be given to relieve the pain in cellulitis, and check diarrhœa. Put an ice-bag or cold applications to the head to relieve headache and delirium. The inflamed parts should be dusted with a powder composed of equal parts of boracic acid and starch, and covered with a layer of cotton wool. When the face is affected, a mask should be made by cutting apertures for the eyes, nose, and mouth in a sheet of lint or linen, and placed over the powdered surface. It may be secured by tapes sewn on at the corners and tied at the back of the head. An attempt may be made to prevent the spread of the inflammation by painting the healthy skin with iodine liniment as a circular band, half an inch wide, surrounding the affected spot ; the band should be an inch away from the inflammatory margin, and the paint applied twice a day for two days. When suppuration occurs hot fomentations of boracic lint should be applied, and changed every three hours ; the soiled dressings must be burnt immediately after removal, as the discharges are very infectious. When erysipelas attacks the mouth or throat, gargles of boracic acid must be used frequently, and small pieces of ice sucked ; hot fomentations should be applied to the neck externally ; inhaling steam and eucalyptus relieves the breathing to some extent.

When the patient is convalescent, the peeling and separation of scabs from the affected parts must have completed before he can be considered free from infection. This may be hastened by bathing the skin with boracic lotion and then smearing it with boracic ointment.

BLOOD-POISONING

Persons suffering from wounds, and women after childbirth, sometimes die of what is popularly called 'blood-poisoning.' This expression is commonly applied to three diseases, in reality quite distinct from one another, though they may sometimes exist together in the same patient. They have certain features in common, the most striking being (1) the poison enters the body by some wound or breach of surface, (2) the onset is usually marked by a rigor, followed by high fever of the 'sthenic' type, and (3) unless recovery takes place the patient rapidly sinks into the condition already described as 'asthenic' fever and dies. In the following brief description the distinctive characteristics are stated, but recapitulation of the symptoms of 'sthenic' and 'asthenic' fever is avoided.

Sapraemia is met with in persons suffering from large suppurating wounds, and in women after childbirth, whose discharges have become foul and cannot escape freely. The poison producing the disease is the product of decomposition, simply a chemical poison incapable of multiplying in the living tissues of the body. The severity of the symptoms therefore depends (1) on the amount of the decomposing discharges, (2) the difficulty they have in escaping, and (3) the extent of the raw surface capable of absorbing them.

Symptoms.—The previously odourless discharges from a wound may be noticed to be putrid, and within twenty-four hours the temperature rises rapidly to 103° or 104°, often preceded by a 'rigor.' There is frequently no rigor, and there is usually only one, but it may be very severe and last for half an hour. The symptoms of sthenic fever are present for the first few days, but if unrelieved, vomiting and diarrhoea may occur, and the patient may rapidly sink into the asthenic condition, with difficulty in breathing, and die in a state of coma.

Treatment.—If the discharges can be allowed to escape freely, and the wound be thoroughly washed out, the symptoms will probably disappear immediately. If the wound has been closed with plaster or sutures, it must be freely opened, and

any decomposing blood-clot or discharge removed, by syringing or douching with boracic or Condyl's fluid. This must be done thoroughly but gently, and the fluid must not be forced in so as to distend the wound. Cases occurring after childbirth must be treated on similar lines, by douching twice a day with antiseptic solution. Recurrence of putrefaction must then be prevented, by using antiseptic dressings and changing them frequently. The diet should be fluid, mainly consisting of milk, and whilst the fever lasts stimulants should be given, and quinine in large doses, grs. 10 immediately the rigor occurs, and then grs. 5 every six hours.

Septicæmia may directly follow sapræmia in persons with large suppurating wounds, but some of the most rapidly fatal cases are met with when the wound consists of a mere scratch or small puncture, inflicted by an instrument contaminated with animal matter. The poison is capable of multiplying indefinitely, and is highly communicable from one injured person to another by means of the fingers and instruments of those in attendance on the sick. Accoucheurs and midwives have to exercise the most rigid precautions lest they convey this disease from one patient to another. Before antiseptics were generally used cases were often recorded when the poison appeared to hang about an individual, in spite of all means of disinfection then known.

Symptoms.—Redness, inflammation, and a small, rapidly forming abscess are usually noticed around the wound a few hours after its infliction, and the lymphatic vessels may inflame and be seen as red lines (Lymphangitis) in the skin leading up to the nearest group of lymphatic glands, which become swollen and tender. The whole limb may rapidly swell to an enormous size, but in some of the worst cases there is no sign of inflammation around the wound or alteration in the limb to be detected. Usually within twenty-four hours a rigor occurs, which is often repeated, and the temperature rises rapidly to 104° or 105°, and remains continuously high, though there may be slight remissions at times. The signs of fever are very marked, complete loss of appetite, and often intense headache. Delirium usually sets in early, and the breathing is frequently much embarrassed by accumulations of mucus in the chest.

Diarrhœa and vomiting may occur, and jaundice is often noticed. The patient rapidly sinks into coma and dies.

Treatment.—Unlike sapræmia, this grave disease is but little influenced by the treatment of the wound. If the wound is on a limb, a ligature should be applied above it and the wound encouraged to bleed, washed out, and hot fomentations applied. Any abscess should be immediately opened. Stimulants must be given freely, with fluid food, quinine in large doses, grs. 10, every six hours, and opium may be necessary to relieve pain and check diarrhœa.

Pyæmia is most often met with in persons suffering from suppurating wounds caused by injuries or diseases of bone, such as compound fractures, or chronic inflammatory ear trouble. It is also met with in cases of suppurating joints, and in people with chronic disease of the lungs attended with profuse expectoration. This disease closely resembles septicæmia, but in addition to the fever and other constitutional symptoms, it is characterised by repeated rigors and the formation of abscesses in various parts of the body, the joints and lungs being particularly liable to be affected.

The poison, like that of septicæmia, is capable of unlimited multiplication in the body, and is probably distributed in the following way:—The blood-clots closing the veins of the injured or diseased tissues become poisoned by the microbes in the pus, and undergo softening. Small portions are washed away in the blood-stream and lodge in distant parts of the body, where the microbes multiply rapidly and cause abscesses to form.

Symptoms.—Pyæmia usually begins about a week after the infliction of an injury, but may occur at any time when a wound is suppurating, or in cases of bone disease. There is often some change noticed in the wound: the discharge may become thin and watery, and the surface look glazed and destitute of granulations. The patient usually feels ill, depressed, and slightly feverish, for a few days before the actual onset of the disease, which is marked by a rigor. This is usually very severe, the temperature rushing up to 104° or 105° , and is followed by profuse sweating and fall in the temperature of several degrees, to 101° or even to normal. The rigors and drenching perspirations are repeated, sometimes at short intervals, but are rarely

absent for more than twenty-four hours. About six days after the onset abscesses begin to form in distant parts; a joint may suddenly become acutely painful and be found greatly swollen in a few hours, from inflammation of the tissues, both within and around the joint, or there may be difficulty in breathing and signs of pneumonia, or pleurisy, due to the formation of an abscess in the chest. The patient's strength rapidly fails, his face becomes pale and shrunk, the pulse rapid and weak, the tongue dry and brown. The thirst is usually intense. Occasionally bright red rashes are noticed, beginning in the armpits or groins and extending down the limbs, and besides sallowness of the skin, there is often well marked jaundice. Death may occur before the secondary abscesses have formed, delirium or convulsions marking the onset of coma.

Treatment.—Beyond supporting the patient's strength and giving large doses of quinine, as in septicæmia, but little can be done when the disease is fully established. It is now sometimes arrested in early cases by a surgeon thoroughly cleansing the wound, and when possible, ligaturing the affected veins which are conveying the poison, and opening and washing out the abscesses immediately they form.

CHAPTER VI

DISEASES CAUSED BY ANIMALS, INSECTS, ETC.

Snake-bites—Hydrophobia—Stings and Bites—Animal Parasites—
Glanders and Farcy—Anthrax.

SNAKE-BITES

SNAKE venom produces the symptoms of shock, nausea, and faintness, often accompanied by vomiting, followed by intense lethargy, lapsing into coma. If the patient survive, the injured limb becomes acutely inflamed, abscesses form and gangrene may occur. The intensity of the symptoms depends on the variety of the snake and the health of the person bitten. The bite of the English viper is rarely fatal.

Treatment.—Tie a ligature tightly above the wound immediately it is inflicted, then suck the wound, which may be safely done provided there are no cracks or sores on the mouth or lips. Encourage bleeding, and wash the wound out as soon as possible with strong ammonia (such as sal volatile), Condyl's fluid, or tincture of iodine. The shock must be treated by giving stimulants in large doses, sal volatile in preference to brandy; but any form of spirit should be freely given, and every effort must be made to keep the patient awake, and from yielding to the lethargy which precedes death. The subsequent inflammation in the limb must be treated as indicated in the treatment of cellulitis. In the tropics the following heroic treatment is sometimes adopted. The tissues around the bites are pinched up and cut away; a paste is then made of gunpowder and blood and the wounds filled with it; this paste is then ignited and the tissues thus cauterised.

BITES OF RABID ANIMALS. HYDROPHOBIA

Dogs, wolves, and jackals are most commonly attacked, but cats and other animals may become infected. The bites of rabid

wolves and cats are more dangerous than those of dogs, owing to their usually biting the face and hands, which are unprotected by clothes. Only fifteen people out of every hundred bitten by actually mad dogs, develop hydrophobia.

Signs of hydrophobia in dogs.—A dog about to become rabid changes its usual habits, becomes restless, and mopes about in dark corners. It will devour all kinds of filth, such as its own excrement, and becomes surly and snappish to other dogs. The bark becomes hoarse, and there is difficulty in swallowing, but there is *no dread of water*. Its affection for its master often continues, whilst the unprovoked biting at other dogs increases. Thick mucus hangs about the mouth, which it endeavours to scrape away with its paws; and though it may have fits of excitement, ‘dumb rabies’—in which the dog remains quiet and becomes paralysed before death—often occurs.

Treatment of a bite inflicted by a rabid animal.—Tie a ligature tightly above the wound and encourage it to bleed. Sucking the wound is dangerous. Cauterise every tooth-mark and scratch thoroughly with nitrate of silver, Condry’s fluid, or carbolic acid. The sufferer should be conveyed with the least possible delay to some institution where Pasteur’s treatment can be carried out.

STINGS AND BITES INFLICTED BY INSECTS, FISH, &c.

Bees, wasps, and hornets.—Extract the sting, if left in the flesh and apply ammonia or bicarbonate of soda.

Gnats, mosquitos, and ants.—Ammonia or bicarbonate of soda.

Scorpions, centipedes, tropical spiders.—Place a ligature above the wound, encourage bleeding, and apply ammonia, vinegar, or turpentine, followed by hot fomentations. Give stimulants if there are symptoms of shock.

Jelly-fish.—Sea-bathers are often stung by these creatures, and suffer from nausea and faintness, besides the pain in the limb affected. A warm bath and a teaspoonful of sal volatile in water if there are signs of shock. Locally, bicarbonate of soda or ammonia.

Weevers and rays inflict troublesome wounds with their sharp spines. Suck the wound and promote bleeding; wash the wound with Condyl's fluid, ammonia, or bicarbonate of soda, and dress with olive oil.

ANIMAL PARASITES WHICH AFFECT THE SKIN

Itch or scabies is due to a parasite which burrows in the skin, causing intense itching, much aggravated when the body becomes warm, as on first going to bed. The clefts between the fingers, the armpits and groins are most often affected, and are marked by scabs and sores due to scratching. The head and face are rarely attacked, but the whole of the rest of the body may be involved. The disease is very contagious.

Treatment.—Rub soft soap all over the body, and then take a hot bath and scrub with a nail-brush. Dry the skin, and then rub in sulphur ointment, which must not be washed off for twelve hours. The clothes must be baked.

Harvest bug.—This is a minute, dark red, spider-shaped parasite, causing intense itching and wheals, chiefly on the feet and legs. Harvest labourers and children picking ripe gooseberries are commonly affected.

Treatment.—Sulphur ointment. Scrubbing the skin is not necessary.

Lice.—1. *Head-lice* give rise to itching, and consequently, scratching of the head. There is often headache, and the scalp feels tender. Sores may form in the skin, usually starting as red patches on the back of the head and neck, accompanied by enlargement of the lymphatic glands. If the hair is lifted up the eggs, or 'nits,' may be seen as small white oval bodies firmly attached to the shafts of the hairs, usually near the roots. The lice themselves are more difficult to find, as they run under the hair.

Treatment.—Cut the hair short in children—this cannot usually be done in women—rub the head and hair thoroughly with ordinary paraffin oil, and then comb out the nits with a fine-toothed comb. The head may then be washed with soft soap and water, dried, and boracic ointment rubbed in to allay the irritation of the skin. The process should be repeated after an interval of three days.

2. *Clothes-lice* are rarely met with except in extremely dirty or old and neglected people.

Treatment.—The clothes must be baked for some hours, or preferably boiled. The body must be washed, and sponged over with a solution of bicarbonate of soda.

3. *Crab-lice*.—*Treatment*.—Ammoniated mercurial ointment well rubbed in on two successive nights, followed by a hot bath in the morning.

The **chigoe**, **jigger**, or **sand-flea**, is common in parts of South America and West Africa, and is occasionally seen in people in temperate climates who have recently returned from abroad. The insect burrows under the nails, and in the skin between the toes, and forms a swelling the size of a pea, which may inflame and cause most serious ulceration of the feet.

Treatment.—To prevent the insect attacking the feet the toes should be rubbed with turpentine, and walking barefooted must be avoided. When the swelling is noticed the insect must be carefully picked out entire with a blunt needle. If the insect is punctured in the process, the cavity must be cleansed with carbolic acid lotion (1 in 20); if an abscess forms, it must be dressed with carbolic fomentations (1 in 40), frequently changed.

The **Guinea Worm** enters the body by impure water, being swallowed in drinking, or whilst bathing, and makes its exit nine or twelve months afterwards through the skin. It is usually discharged in the foot near the heel. A swelling attended with itching is first noticed, and a blister gradually forms, which may or may not be attended with severe inflammation. The blister then bursts and the worm begins to come away. It is usually between two and three feet long, and if it can be got away entire the wound rapidly heals; if it is broken severe inflammation and suppuration may follow.

Treatment.—The blister having broken, the presenting part of the worm is gently seized and wound round a piece of cardboard, stick or small reel; from day to day a fresh portion is wound round until the whole worm is extracted. If the worm breaks and suppuration occurs, the wound must be constantly syringed out with dilute Condyl's fluid, or tincture of iodine, and hot fomentations applied.

GLANDERS AND FARCY

This disease may be contracted from glandered horses. When the internal organs are affected the term *glanders* is used. *Farcy* is applied to the external forms of the disease. The signs of glanders in a horse are first weakness and loss of condition, followed by a thin discharge from the nose and swelling of one or more of the limbs. Enlargement of the glands under the jaw rapidly occurs, and cough sets in. The mucous membrane of the nose ulcerates, and the discharge may become thick and stained with blood. The skin then becomes thickened, abscesses form, and the animal emaciates and dies.

In man, farcy is the common form of the disease. The poison is usually contracted through a wound or scratch, and within a few hours there is inflammation of the part and the lymphatics leading from it, with pains in the limbs and high fever, followed by the rapid formation of an abscess. In some cases when there is apparently no wound the disease may not appear for one or two weeks after infection, and the onset is marked by rigors and intense pain in the muscles and joints. Patches of redness appear in the skin and hard shotty pimples, like small-pox, may form. Abscesses form in various parts of the body, and the patient has difficulty in breathing, becomes exhausted, and dies. The disease often runs a less acute course and the patient ultimately recovers.

Treatment.—The nurse must take every care against infecting her hands. The patient's strength must be supported, the abscesses opened and washed out with antiseptics. Quinine may be given in doses of 5 grains every six hours.

ANTHRAX, MALIGNANT PUSTULE, OR WOOL-SORTERS' DISEASE

This disease is contracted from animals suffering from splenic fever, usually from infected wools or hides. The poison may be inhaled or swallowed, causing *anthrax* of the lungs or intestine, or it may be inoculated by a crack in the skin and cause *malignant pustule*.

Symptoms.—Shortly after inoculation a raised red spot forms, accompanied by itching. Within twenty-four hours the spot becomes a blister, and the tissues around are hard and inflamed.

The blister increases in size and bursts on the third day. On the fourth day the site of the blister is marked by a dry black slough, and around it a ring of other blisters are beginning to form, which run a similar course, with great swelling of the surrounding parts. The constitutional symptoms may be very slight at first, but usually there is profound prostration by the end of the week, followed by death after a few days.

Treatment.—The pustule should be widely excised immediately the nature of it is recognised, and the wound cauterised with strong antiseptics.

Internal anthrax affecting the lungs or intestine causes profound prostration, and death commonly occurs before any definite symptoms pointing to disease of a particular organ have developed.

Treatment must consist solely in supporting the patient's strength.

CHAPTER VII

INJURIES TO BONES—FRACTURES

General Principles of the Treatment of Fractures—Remarks on Special Fractures—Compound Fractures.

BONES may be broken by a blow fracturing the bone at the point struck, 'direct violence'; by force transmitted up the limb, 'indirect violence,' as when a man falls on his hand and breaks his collar-bone; or by the muscles pulling a bone apart, 'muscular action,' which is a frequent cause of fracture of the knee-cap. When a bone is broken there is always some laceration of the surrounding tissues, but if the skin is intact it is called a 'simple' fracture, a 'compound' fracture if the skin is broken. Sometimes there are several fragments due to splintering or crushing of the bone, and this is called a 'comminuted' fracture; when a bone breaks and one fragment is driven into the other, which not infrequently happens at the wrist and hip, the term 'impacted' fracture is used. The bones of young children are less rigid than those of an adult, and they are sometimes bent and partially broken like a tough hazel twig, and from this the name 'green-stick' fracture has been derived.

The common signs of fracture are :—

1. Voluntary movement is either impossible or very difficult.
2. Unnatural movement may be noticed, especially in the long bones of the arms and legs. For example, if the upper arm has been broken, on grasping the shoulder and elbow the shaft of the humerus no longer feels firm and rigid, but bends whichever way we press it, causing much pain.
3. The limb looks deformed, and unlike its fellow.
4. There is shortening of the limb on measuring it, and comparing it with its fellow.
5. On grasping the limb above and below the seat of pain, and on attempting to move it, a peculiar grating sensation

may be felt, which is called 'crepitus,' due to the rough, broken ends being rubbed together. This is particularly noticeable in comminuted fractures, but may be absent if some soft tissue, such as muscle, has been interposed between the broken ends; it is always absent in 'green-stick' and impacted fractures, and only a rubbing instead of a grating sensation may be felt when the cartilaginous bone of a young child is completely broken. It is often extremely difficult to detect when only one rib is broken, as the neighbouring ribs act as splints.

GENERAL PRINCIPLES OF THE TREATMENT OF FRACTURES

Every possible gentleness must be used in the examination and treatment of a fracture. Our first care, if the fracture be a 'simple' one, is to prevent it from becoming 'compound' by supporting it and fixing it with temporary splints; if it is a 'compound' fracture, to prevent the wound from being poisoned by the entry of microbes, by putting on some clean dressing.

In old days a compound fracture was regarded as one of the gravest of injuries, because it was so commonly followed by prolonged suppuration, death of the ends of the bone, and blood-poisoning, and the sufferer was considered fortunate if he escaped with a shortened and deformed limb without having to undergo amputation. Now, since the introduction of antiseptic dressings, though an injury calling for the utmost care, a compound fracture often unites as readily as a simple fracture, the wound in the skin healing in a few days, and the new bone forming without the formation of a drop of pus.

We must also remember that the jagged ends of a broken bone may not only perforate the skin, but may lacerate the deeper tissues, including nerves and arteries; therefore it is of the utmost importance to keep a broken limb absolutely at rest until skilled help is obtained. Though a simple fracture will probably unite if left to itself, provided the limb is kept at rest, there will be considerable deformity unless the bones are set by a surgeon. When a bone breaks, the two ends commonly overlap, and the muscles pull them so that they are displaced laterally and the lower fragment is drawn up, overlapping the upper fragment. There is no chance of this faulty position being corrected by Nature; a surgeon sets a fracture by putting the limb

in such a position that the muscles are as far as possible relaxed. He then steadies the upper fragment, or gets an assistant to do so, if it is a muscular limb, and by gentle but steady pulling on the lower fragment he overcomes the muscles which are causing the bones to overlap, draws the lower fragment down until the broken ends are opposite to each other, and with one hand over the injured spot, manipulates them into position. The steady pull on the limb being still maintained, splints are put along the limb and bandaged on, so as to keep the bones in position. It is of great assistance to a surgeon to have the patient under the influence of chloroform, which causes relaxation of the muscles; in fact, it is almost impossible to overcome the powerful muscles of a man's thigh and set a fractured femur without it. However skilfully a broken bone is set, there is usually some deformity in the outline of the bone to be detected for some years afterwards. This is very noticeable in the collar-bone; some loss of pronation and supination commonly follows fractures of the radius and ulna, and there is almost invariably some shortening left after fractures of the thigh.

REMARKS ON SPECIAL FRACTURES

Skull.—The bones of a child's skull are frequently bent inwards by a blow without breaking the skin, but in an adult the fracture is usually compound.

The concussion, so often present, must be treated, and the symptoms of compression of the brain watched for, stimulants being rigidly withheld. The scalp must be shaved around the wound, and antiseptic dressings applied. After a blow on the top of the head, extravasation of blood beneath the eyelids, or bleeding from the nose, mouth, or ears, are grave signs of the base of the skull being fractured. Absolute and prolonged rest must be insisted upon.

Lower jaw.—These fractures are usually compound, the mucous membrane covering the gums being torn. Endeavour to get the teeth in line by manipulating the fragments with the fingers in the mouth and the thumbs under the chin. Apply a four-tailed bandage (see page 164, fig. 29), which may be stiffened with paste or plaster of Paris. Fluid food, administered with a

feeder or syringe ; the patient turns on his side, and the tube is inserted between the teeth and the cheek, and the fluid is sucked through the teeth. Wash the mouth out after every feed with boracic solution or weak Condly ; the fluid is introduced in the same way as the food, and then blown out through the teeth.

Collar-bone.—The commonest of all fractures ; often occurs in young children by rough persons jerking them up off the ground by the arm. There may be little or no deformity, but the arm hangs helplessly, and a day or two later a lump is noticed about the centre of the bone. In an adult the shoulder falls inwards and droops below the level of its fellow.

The treatment consists in raising the shoulder up, pulling it back, and fixing the arm in this position. First, place a pad, about the size of a cricket-ball, well up in the armpit, and secure it there with a four-tailed bandage or a strip of strapping passing over the shoulder ; this keeps the upper part of the arm and the shoulder away from the side. Now pull the shoulder back, bring the elbow close to the side, and bend the forearm across the chest. It is best secured in this position with a roller bandage 4 inches wide. Loop the end of the bandage round the upper arm and stitch it firmly, pull on the bandage so as to carry the arm well back, and then roll the bandage across the patient's *back*, then under the sound arm and over the front of the chest, including the forearm of the injured limb, then over the upper arm, and continue it in the same direction until the arm is bandaged firmly to the side ; one or more turns should be carried under the elbow to support it, and when the bandage is completed it should be sewn where the layers cross one another to prevent it from slipping and getting loose.

A broken collar-bone takes about five weeks to unite.

Humerus.—This bone when fractured is difficult to keep at rest, but the following method is easy to carry out, and produces fairly good results. Prepare a pad and place it along the inside of the arm from the armpit to the elbow. The pad should be thicker below where the elbow rests than above ; a small cushion or pillow, with some of the stuffing displaced so as to make it thicker in one part, makes a good pad. Pull the elbow downwards gently but steadily, and bend the forearm

across the chest. Now bandage the arm, with the pad interposed, against the side of the chest, care being taken that no turn of the bandage presses on the elbow so as to force the lower fragment upwards. The bandage may then be sewn, or stiffened with paste or plaster of Paris.

This bone unites in about six weeks.

Elbow.—Fractures in the neighbourhood of any joint, particularly the elbow, are extremely difficult to treat; marked deformity or greatly limited movement often follows. A stiff arm is more useful if the elbow is bent than if it is fixed in the straight position, so it is best to bend the forearm, making the angle at the elbow rather less than a right angle. Prepare an **L**-shaped splint, the upper limb to be bandaged to the humerus, the horizontal limb to the forearm; this may be made of cardboard, or two pieces of wood nailed together, the ends of the nails being knocked off flush and the angle rather less than a right angle, for the reason given above. Pad the splint and bandage it on, either inside or outside the limb, whichever side is least bruised; the turns of the bandage encircling the elbow itself must be carried round very lightly. Place the forearm in a sling. When it is impossible to get the help of a surgeon, the splints may be abandoned a fortnight after the accident, and the sling only used during the day, gentle attempts at movement begun, gradually increased day by day, and the splint replaced at night. A much-deformed but a more useful elbow will probably result than if the splint is used constantly for the whole period of six weeks which the bones take to unite.

Forearm.—The radius and ulna may be broken either separately or together, and the deformity may be reduced by fixing the elbow at a right angle and steadily pulling on the hand, the thumb being upwards and the palm towards the chest. If the fracture is near the elbow an **L**-shaped splint with a long horizontal limb should be used, so as to fix both the humerus and the forearm. If the fracture is about the middle of the forearm, any straight splints will serve the purpose, one applied to the front, the other to the back of the forearm. Remember that the elbow must be bent before the splints are

applied, and the arm must be put in a sling immediately afterwards ; on no account must the splints be first applied to the forearm, and the elbow subsequently bent.

Union takes place in about five weeks.

Wrist.—A 'broken wrist' is almost invariably a fracture of the lower end of the radius ; the lower fragment, with the attached wrist-bones and hand, is displaced backwards and overrides the upper fragment, and the hand is displaced towards the radial or thumb side of the forearm. The injury looks almost like a dislocation of the joint, but dislocations of the wrist are so uncommon as to be almost unknown.

Treatment.—Two laths of wood $2\frac{1}{2}$ inches broad, and long enough to extend from the elbow to the knuckles, make good splints. The splint for the palmar surface of the forearm should have the end on which the hand rests cut obliquely instead of being square, the upper edge of the splint being longer than the lower edge. The object of this is to tilt the hand over to the little finger or ulnar side. To apply the splint, bend the elbow so that the forearm lies across but a little way from the chest. Lay the palmar splint along the front of the forearm, the oblique end on a level with the transverse crease in the middle of the palm, and bandage the hand firmly on to it ; now fix the elbow and pull steadily on the hand, first in a straight line, and then towards the ulnar side, and keeping it in this position, bandage the splint on up to the elbow. The splint for the back of the hand and forearm is then bandaged on and the arm placed in a sling.

Time of union, about five weeks.

Metacarpal bones are sometimes broken by striking a blow with the fist ; the **phalanges** are usually broken by being crushed. Some deformity is usually left after fracture of either. The hand and forearm should be bandaged to a splint, the palm resting on a thick rounded pad.

Ribs may be bent outwards and snap from the chest being compressed, or a blow may break them and drive the fragments in, causing laceration of the pleura and lung. When the ribs are broken there is pricking or stabbing pain in the side, greatly aggravated by drawing a deep breath or coughing ; the

patient consequently draws quick, shallow breaths. If a hand is laid over the injured spot and the patient coughs, crepitus may sometimes be felt. Pressing the chest, with one hand on the breast-bone, the other on the spine, often causes pain at the damaged spot.

Treatment.—Rest. If strapping is at hand, broad strips should be carried round the affected side, starting at the spine and finishing at the breast-bone; it is no use to simply lay these on the skin, but the side must be actually compressed. The strips should be applied by making one end to adhere firmly over the spine, then grasp the shoulder of the affected side, tell the patient to breathe out, and bring the strip with a steady pull round the side and make it stick by rubbing it lightly but quickly with the palm of the hand. A bandage, 6 inches wide, carried firmly round the chest, may be used in the absence of strapping. If the patient cannot be kept in bed, the arm on the affected side should be placed in a sling. If bandaging or strapping the chest increases the pain, or the ribs are actually driven in, which can sometimes be detected from the appearance of the chest, no form of constriction should be used, but the chest must be left free and the patient kept in bed.

Fractured ribs unite in about four weeks.

Thigh-bone.—This rarely breaks except as the result of great violence, though old people sometimes break the neck of the bone by simply tripping or jarring the foot by slipping off the curb of the pavement, or even by turning in bed. Unless treated by a surgeon great deformity will certainly result. If a man breaks his thigh in the field, he should be laid flat on his back, and the knees and legs of the two limbs be bandaged together, the sound limb acting as a splint to the other, and he may then be conveyed home, still lying on his back, and on no account be allowed to sit up. On arriving home, the pain may be greatly relieved by steadily pulling on the foot and leg, but as the helper's arms become exhausted long before the thigh muscles of the patient, it requires at least two people to take turns and relieve one another until the surgeon comes. If the fracture has taken place in the upper part of the bone, near the hip-joint, *make no attempt to apply a splint, and do not pull at the limb*; fractures in this position are often impacted, and are

best allowed to remain so without separating the fragments. If the bone breaks near the knee-joint, the patient is often more comfortable with the knee slightly bent over a pillow. A splint for a fractured thigh should extend from the armpit to the foot; a stout lath of wood or a broom-handle may be used. It must be firmly secured in four positions: (1) round the chest; (2) round the pelvis, just above the hips—this is of great importance; (3) at the knee; (4) at the ankle.

A femur unites usually in about eight weeks, but another month must elapse before it is safe to use it.

Knee-cap.—This bone may be split into several pieces by falling on the knee, or torn in two by the action of the muscles; the latter is by far the graver injury, as the fragments are usually pulled widely apart, and can rarely be brought together except by an operation.

Treatment for both forms of injury.—Relax the muscles of the front of the thigh by propping the patient up in a half-sitting position; keep the limb straight, and raised on pillows. Apply a splint to the back of the limb from the buttock to the heel, and cold applications over the broken bone and knee-joint, in the form of an ice-bag if it can be procured, or failing this evaporating lotion.

Unless united by operation it is rarely safe to trust a fractured patella without supports for six months.

Bones of the leg.—Fractures are most common at the shin, and are very frequently compound, owing to the edge of the tibia being sharp and lying just under the skin.

Treatment.—The readiest way of supporting this fracture is to pull steadily on the foot whilst the knees and ankles of the two limbs are being fastened together. The broken bone may be 'set' in the following way. Stand at the foot of the bed and relax the muscles of the calf by bending the knee. Steady the thigh-bone, and keep the knee bent with one hand in the ham, whilst you pull steadily on the heel with the other hand. An assistant then places two well padded-splints, one on each side of the limb, and bandages them on. The splints must reach from the knee to the sole of the foot.

Union takes place in about eight weeks.

Fractures of the ankle are commonly caused by slipping and twisting the foot outwards, which snaps the fibula about two inches above the ankle. There is great pain, some turning of the foot outwards, often much swelling, but crepitus is difficult to detect. It is possible to walk for some distance, though with great pain, after this injury. The immediate treatment consists in keeping the foot off the ground, elevating the leg on pillows, and applying cold applications. The permanent treatment is troublesome, and some tendency to flat foot often remains. One straight splint on the inside of the leg, three inches wide, and extending about three inches beyond the sole, may be used. Pad it thickly from the knee to the ankle, particularly just above the ankle, more thinly below, where the instep rests. Bandage the limb on to the splint, keeping the foot well at right angles with the leg, but turning the sole rather inwards to correct the tilting outwards.

COMPOUND FRACTURES

The consequences of a wound communicating with a fracture becoming poisoned have already been indicated. Our first duty, therefore, is to cover the wound with a clean dressing to protect it from the air; the limb should then be supported with temporary splints, and a surgeon sent for.

When skilled help is not to be had, the wound, the bone if it is protruding, and the surrounding skin, must be thoroughly cleansed in the manner described in the *TREATMENT OF WOUNDS*. Protruding bone is often extremely difficult to replace, as the elastic skin contracts, and may be nipped under the bone. An attempt should be made to replace it by pulling on the limb, and at the same time freeing the skin from under the bone by raising it with forceps or a probe. If these efforts fail, support the limb with splints, and apply an antiseptic dressing over the wound and the end of the protruded bone. The skin will perish by ulceration at the spot where it is nipped, and the exposed bone will also die and be separated after some months; but provided the limb is kept at rest and the wound thoroughly clean it does not necessarily follow that blood-poisoning will occur, though there is considerable risk of it doing so. A much shortened and deformed limb will certainly result.

When the bone has been replaced, or if it has not protruded from the first, a temporary dressing should be placed on the wound, and splints applied as for a simple fracture ; but if possible they should be arranged so that they do not lie over the wound, and the bandages which secure them should be carried up to the wound and fastened off, and then begun afresh above the wound and carried up to the top of the splints. This prevents the necessity of shifting the splints every time the wound is dressed. Having fixed the splints, apply a dry dressing, and secure it by passing the bandage over the splints as well as the dressing. The subsequent treatment of the wound must be conducted on the lines already laid down in the management of wounds.

CHAPTER VIII

INJURIES AND DISEASES OF JOINTS

Dislocations and Sprains—Wounds of Joints—Arthritis—Synovitis—Tuberculosis—Foreign Bodies in Joints—Injuries and Diseases of Tendons—Diseases of Bursæ.

IN dealing with the various diseases and injuries which may affect a joint we must bear in mind the various structures which enter into its formation. The ends of the bones are covered with smooth cartilage, and are bound together with ligaments, and the interior of the joint is lined with synovial membrane. In contact with the ligaments, and sometimes perforating the joint cavity, tendons and friction-preventing bursæ are frequently interposed. All the structures are freely supplied by fine blood-vessels and nerves, except the cartilages.

DISLOCATIONS AND SPRAINS

When a joint is subjected to violence, the ligaments and synovial membrane are injured by being stretched or torn, and the bones may escape from the joint, forming a 'dislocation'; if they are retained in the joint, it is called a 'sprain.'

When a joint is sprained, there is swelling, and great pain caused by movement, but the joint can be moved, and there is no alteration in the length of the limb; when dislocation occurs, the previously movable joint becomes fixed, the limb, when compared with its fellow, is either shortened or lengthened, and deformed, and the bones may be felt in an obviously faulty position. Like fractures, dislocations may be either simple or compound, but the smooth end of an unbroken bone is not so easily forced through the skin as the sharp end of a fracture. In cases of great violence a bone is sometimes dislocated, and fractured as well, an injury most difficult to treat; the bone is also occasionally broken in attempting to replace a dislocation.

A surgeon should be summoned as promptly as possible whenever a dislocation is suspected, as delay considerably increases the difficulty in reducing it, and no unskilled person should attempt it, unless a surgeon's help is not to be obtained for many days. Some people repeatedly dislocate the same joint, and acquire the knowledge, and instruct others, as to how it can best be reduced.

The following are the joints most commonly dislocated, and the most simple way of attempting to reduce them is described; there are many other methods which are undoubtedly better, but which require a surgeon's skill to carry out.

The lower jaw may be dislocated by opening the mouth too widely, as in yawning, or by a blow on the side of the jaw. The joints on both sides are usually displaced, and the mouth is fixed widely open with the chin protruding, the patient looking 'under-hung.' It causes great distress, as there is much pain, and swallowing and speaking intelligibly are almost impossible. When only one side is displaced, the mouth is fixed open, but the chin looks twisted round towards the unaffected side.

To reduce it, seat the patient on the floor, and place two corks or small pieces of wood, about half an inch thick, between the back teeth. Stand behind him, and supporting his head with your knees, place your hands under his chin, and pull steadily as though you intended to lift him off the ground. The jaw may be heard to slip in with a click.

The shoulder may be dislocated by falls on the outstretched hand, or blows on the arm or shoulder. When the elbow is pressed against the chest, the opposite shoulder cannot be touched by the hand, and the roundness of the shoulder is diminished. The arm is fixed often at right angles with the trunk immediately after the accident.

Treatment.—Reduction may be effected by forcibly pulling the arm up above the head with one foot on the shoulder (fig. 51); or by padding the arm, and attaching a rope above the elbow, passing the other end of the rope over a beam or the bough of a tree, and pulling the patient up off the ground. Another way is to lay the patient on the ground, pull off your boot, and

sitting by the patient, place your heel in his armpit, and with your leg straightened, pull steadily on his arm with both your hands for some minutes; as his muscles become tired and relax the bone may be felt to shift suddenly into its proper position.

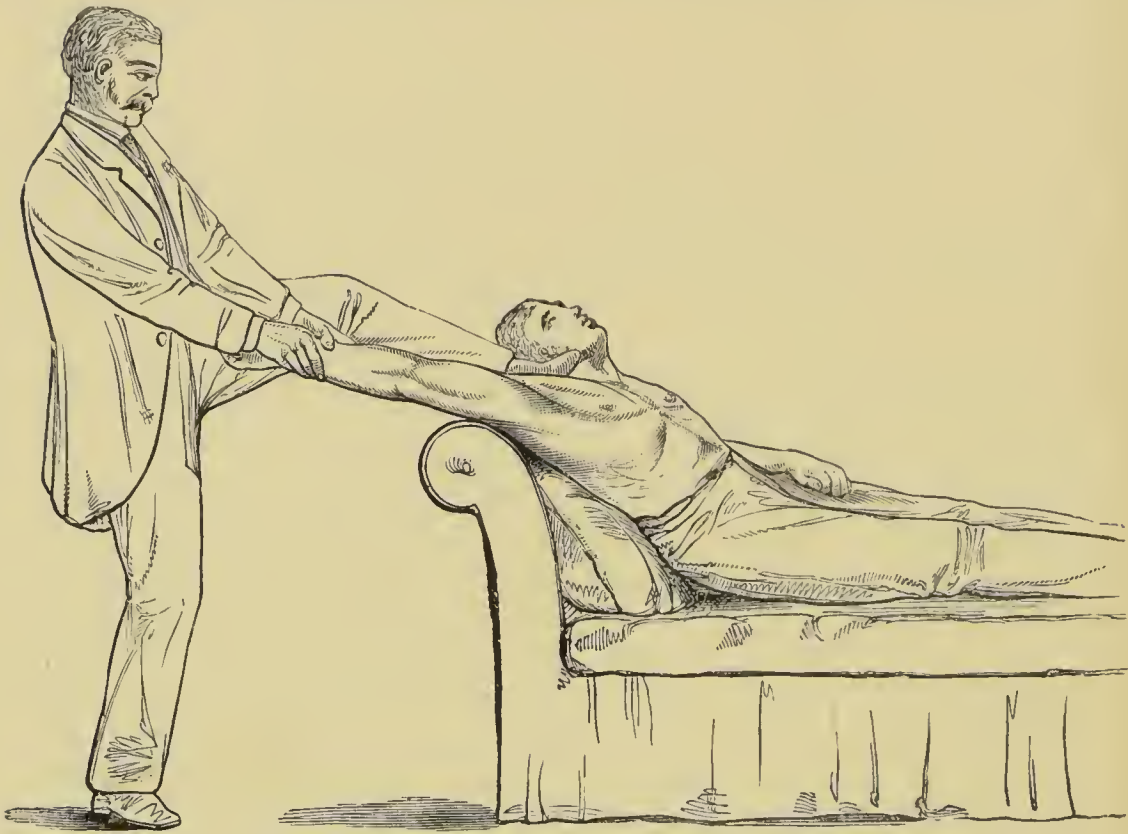


FIG. 51.—REDUCTION OF A DISLOCATED SHOULDER.

After-treatment.—Place the forearm in a sling, and bandage the arm to the side for one week. Gentle movements may be then begun, but the sling must be worn for another fortnight.

The elbow.—The commonest displacement is for the ulna and radius to be forced backwards by falls on the hand, or with the arm bent under the body. The forearm looks shortened from the fold at the bend of the elbow to the wrist, when the two limbs are compared, and the tip of the elbow is more prominent behind.

Treatment.—Seat the patient on a chair, resting his elbow on a table. You then seat yourself on the table, and pass one of your legs over his arm, holding it down by the weight of your thigh. Grasp his hand with both of your own, and then pull first directly upward, then in the direction towards his shoulder, thus bending his forearm over your thigh.

Thumb and fingers.—The bones of the thumb and fingers are frequently displaced by blows, and often baffle the most skilled surgeons to replace them, owing to tendons or torn ligaments intervening between the joint surfaces. An attempt may be made to reduce the dislocation by simply pulling on the thumb or finger, which the patient has probably already done instinctively to relieve the pain. If this fail, traction may again be made, and the joint at the same time bent forcibly backwards, and then brought once more into the natural straight position. The joint will probably remain enlarged and tender for some weeks.

Hip.—These dislocations are so rare, so hard to distinguish from fractures near the joint, and require so much skill to reduce them, that it is futile to endeavour to describe them and their treatment.

Knee.—This joint is rarely dislocated, though frequently sprained. The knee-cap is sometimes displaced, most often to the outside of the limb, and may be replaced by making the patient sit down and lean as far forward as possible, whilst the knee is kept straight, and the knee-cap pressed into position. A splint must be applied to the back of the limb, to keep the knee from being bent, for three weeks. The *cartilage on the inner side* of the knee, which lies between the femur and the tibia, is often forced out of its place during some movement which causes twisting of the joint. The accident is followed by sickening pain, inability to straighten the knee, and a projection may be felt on the inner side, and rather to the front of the joint. It may be replaced by bending the knee, placing one thumb firmly on the projection whilst the leg is moved, or, rather, ‘wagged’ from side to side, with the other hand. This accident is extremely likely to occur again unless a support is constantly worn to keep it in its place.

Ankle.—The common dislocation of the ankle is an exaggeration of the displacement which accompanies fracture of the lower end of the fibula, and can hardly occur without the bone being broken. The foot is turned outwards, the outer edge of the foot being tilted up. It may be reduced by bending the knee, pulling on the foot, and at the same time twisting it into its

natural position, when it must be fixed on a splint, and the fracture treated as previously indicated.

The after-treatment of dislocations is identical with the treatment of sprains of a joint.

Sprains, treatment of.—The joint must be put at rest and cold applications used at first to arrest the bleeding from lacerated blood-vessels, and allow the strained or torn ligaments to heal. Splints may be applied as for fractures, and cold by the same methods as already indicated in treating contusions. The swelling which so constantly follows injury to a joint is not due simply to extravasation of blood, but also to inflammation of the synovial membrane (synovitis), which will be further described. A joint after injury must not be kept rigidly fixed on a splint too long, or the ligaments and tendons may adhere together and a stiff joint result. After the swelling has begun to diminish, usually from ten to fourteen days after the injury, gentle movements of the joint may be begun, hot douching used night and morning, and a bandage and sling substituted for the splint. Rubbing and gentle kneading of the joint with oil, or some form of liniment, will hasten the return of movement. The routine should be (1) douche, (2) rub, (3) move, and finally bandage the joint. A bandage should be used to support the joint for some weeks after the injury, as otherwise it will often swell when the limb is again used. Should the joint continue to be swollen for some time after the injury, or the swelling return after temporary subsidence, there is possibly tuberculous disease (see CHRONIC SYNOVITIS) present, which is a grave condition requiring skilled treatment.

Wounds of joints.—The cavity of a joint is sometimes opened by the dislocated bones being forced through the skin, or by incised or punctured wounds. When there is a wound in the neighbourhood of a joint, no attempt should be made to find out whether the cavity has actually been penetrated, but every precaution taken against air being admitted. If the wound is lacerated, the parts should be washed and an antiseptic dressing applied; if a clean cut, or a puncture with a clean instrument, it should be allowed to bleed for a few minutes, and a dry dressing then applied, without attempting to wash out the

wound ; the limb should be fixed on a splint in every case. If suppuration occurs, the condition is very serious, particularly if it is in a large joint, such as the knee, and is attended with great pain, high temperature, and swelling of the knee and surrounding parts ; it can only be dealt with by a surgeon.

ARTHRITIS

Arthritis means inflammation of a joint, including all the structures which enter into its formation. The synovial membrane and fibrous structures are chiefly affected in certain diseases, such as rheumatism, but the condition may commence in the bones, especially in tuberculous disease, and in chronic rheumatoid arthritis the cartilages are early affected. When pus forms in a joint it is called a 'suppurative arthritis' and the whole joint rapidly becomes disorganised, owing to the softening and destruction of the synovial membrane, ligaments, and cartilages.

The treatment will be dealt with under the special headings of the diseases in which it occurs.

SYNOVITIS

Synovitis means inflammation of the synovial membrane, and may be due to injury, being a constant accompaniment of sprains and dislocations, or to rheumatism, gout, and other constitutional diseases. It may be acute or chronic.

1. **Acute synovitis.**—Causes : injury, gout, rheumatism.

Symptoms.—Pain, heat, and swelling of the joint. There may be high fever if due to rheumatism. Any movement of the joint causes acute pain, and the limb is usually kept somewhat bent to relax the ligaments, and ease the pain. There is marked increase in the quantity of synovial fluid secreted, and the knee may become distended so that the patella is lifted up off the femur, and fluctuation may be felt on making pressure with the fingers alternately on each side of the joint.

Treatment.—If due to injury, rest the joint, place it on a splint, and apply cold. For subsequent treatment see SPRAINS, TREATMENT OF.

When due to rheumatism, blisters in the form of one or

more pieces of mustard plaster, the size of a florin, may be applied, and the joint then wrapped up in hot dry wool, and a flannel bandage applied. Treat the disease. Gouty joints may be painted with belladonna and glycerine, and wrapped up in wool; as the acute symptoms subside, douche the joint with hot bicarbonate of soda, or common salt solutions, and support with a flannel roller.

2. **Chronic synovitis** may follow the acute form, or it may arise with little or no pain or signs of inflammation, the joint simply feeling somewhat stiff and weak, and is then noticed to be swollen. It may occur in persons suffering from some constitutional taint, such as gout, rheumatism, or diseases of the nervous system, but by far the commonest cause is tuberculosis.

Treatment.—Treat the disease; rest and fixation of the limb on splints. Counter-irritation by blisters or painting with iodine, pressure by means of a well-applied bandage.

TUBERCULOUS, STRUMOUS, OR SCROFULOUS DISEASE

For reasons given elsewhere these conditions may be regarded as identical, and the same description applies to all. Children and young adults are most often affected, but it may occur at any age, usually after some slight injury, or sometimes without any apparent exciting cause.

The common story of these cases in children is, that after some slight strain, or prolonged walk, the child was noticed to limp, or use a limb stiffly, and free movement of the joint caused pain. The joint was then noticed to be slightly swollen, but often without any heat or sign of inflammation. Little notice was taken of it, but the swelling gradually increased, and the child was then brought for treatment. On examination, the tissues around the joint were found to be thickened so that the natural depressions and other markings are obliterated, and the muscles of the limb above and below the joint are somewhat wasted, which may be detected by measuring and comparing the circumference of the two limbs. There may be considerable increase of synovial fluid, detected by the sensation of fluctuation in a large joint such as the knee, but more often the tissues feel solid and doughy, and on making pressure with

a finger the impression remains for half a minute or more. The skin over the swelling usually shows no sign of inflammation, and there is little or no redness; hence the old name for this disease, 'white swelling.'

When the disease begins in the bones there is less swelling, but considerably more pain, especially during the night, and a localised tender spot may be detected by pressing the ends of the bone with the finger at various points. The patient may be fairly comfortable during the day, but be kept awake at night, or awake with a scream after dropping off to sleep, from acute pain, which is often referred to some point at some distance from the joint; thus, in disease of the hip the pain is often referred to the knee on the same side, which is often quite healthy.

The subsequent course of the disease depends on the general health of the individual, his surroundings, and treatment. Abscesses may form, and the joint may be seriously impaired or destroyed.

Treatment.—The early recognition of this grave disease is all-important; it has been described somewhat fully because the onset is usually so insidious, and escapes the notice of parents until the joint is irrevocably damaged. It is a disease which essentially calls for skilled treatment, absolute rest of the joint and fixation on a splint; if the lower limb is affected, the joint must not be allowed to bear any weight by using it for walking; at the same time the patient should be kept out of doors in fine weather as much as possible. Counter-irritation, blisters, or painting with iodine may be employed. For the constitutional treatment, see TUBERCULOSIS.

FOREIGN BODIES IN JOINTS

After injury or disease of a joint, and in some cases from no discoverable cause, a fibrous or cartilaginous body may form, interfering with the movements of a joint, and give rise to acute pain from being squeezed between the bone surfaces and wrenching the ligaments. They are most common in the knee, and during the act of walking may suddenly give rise to acute sickening pain, the joint becoming suddenly locked, and the patient falling down. Acute synovitis of the knee may follow the accident.

Treatment.—Support the knee on pillows in the bent position, and apply cold. Make no attempt to straighten the limb forcibly; the unlocking of the joint usually takes place as suddenly and unexpectedly as it occurred. The accident will probably recur, and a surgeon should be consulted.

INJURIES AND DISEASES OF TENDONS

These structures may be torn across or strained when a joint is dislocated or sprained, and may be divided by the infliction of a wound. They readily unite if the injured part is kept at rest as directed in the treatment of Dislocations.

Teno-synovitis, inflammation of the sheath of a tendon, often occurs as the result of a sprain or over-use of a joint. Men after a hard day's rowing, and women wringing out clothes at a wash-tub, often suffer from it, the tendons of the thumb and back of the wrist being affected. There is stiffness of the joint and pain along the course of the tendons, with some swelling. On laying the hand on the tendons and getting the patient to move the wrist and rotate the thumb, a rubbing sensation may be felt, due to the tendons and their sheaths being roughened. The joint must be kept at rest, and counter-irritation applied until the pain has subsided, then hot douching to relieve the stiffness, and a bandage to support the part.

A **ganglion** is a cyst in connection with the sheath of a tendon. The most common place for it to occur is at the back of the wrist, forming a rounded, hard, or semi-elastic swelling. It is usually painless, but may give rise to dull aching or neuralgic pain in the wrist.

Treatment.—If they have not been in existence long, they may usually be dispersed by striking them a sharp blow with the back of a book, or by a sudden squeeze with the thumb of a person having a strong hand. When dispersed the spot should be kneaded and rubbed several times a day to prevent them re-forming. If these means fail, they must be treated by a surgeon. Painting them with iodine is often practised, but rarely with any benefit.

DISEASES OF BURSÆ

A bursa frequently becomes inflamed and distended with fluid as the result of continued irritation. A 'housemaid's knee' is the most common example, and is due to prolonged kneeling and inflammation of the bursa over the ligament of the knee-cap. The elbow, buttock, and back of the knee are also sometimes affected, especially in rheumatic, gouty, and tuberculous persons. The inflammation is sometimes acute, and attended with redness, heat, and much pain, and suppuration may occur, but more often the swelling is of slow formation and attended with but little pain.

Treatment.—Housemaids should avoid their occurrence by using soft pads to kneel on. When inflamed the joint must be kept at rest, and cold applied; after subsidence of the acute symptoms, or in cases which have been of slow formation, they may be painted with iodine and pressure applied by means of strapping or a bandage, and future irritation avoided.

A **bunion** is an enlarged bursa over the big-toe joint, usually with a corn seated over it. Pressure from the boot must be avoided, the corn treated (see CORNS), and belladonna and glycerine painted on.

PART VI

GENERAL DISEASES

CHAPTER I

INFECTIOUS FEVERS, USUALLY WITH SKIN ERUPTIONS

General Consideration—Scarlet Fever—Measles—German Measles—Small-Pox and Vaccination—Chicken-Pox—Enteric or Typhoid—Typhus.

IN dealing with infectious diseases there are certain points which call for some preliminary explanation, as they have so important a bearing on the diagnosis and on the steps which should be taken to prevent the infection of other people.

When microbes enter the body of a person whose tissues are in a suitable condition for their growth—in other words, ‘infect him’—they multiply, but produce no symptoms for a period of varying duration—the ‘period of incubation’; they then cause signs of illness, more or less marked and characteristic, according to the nature and severity of the disease: these constitute the ‘onset,’ ‘sickening,’ or ‘invasion.’

After these symptoms have existed for a more or less constant period, the ‘development’ of the disease occurs, which is marked in certain affections by the appearance of a rash on the skin, from the character and distribution of which, together with other constitutional symptoms, the nature of the disease can usually be determined.

During the course of certain diseases some organs are specially liable to disturbance, constituting what are spoken of as ‘complications,’ such as pneumonia in measles, inflammation of the kidney in scarlet fever, and the disease may prove fatal, or convalescence be delayed, by the affection of these organs rather than by the effects of the original poison.

We must therefore note as accurately as possible:—

1. The probable date and source of infection.
2. The period of incubation.
3. The symptoms and duration of invasion.

4. The date of appearance of rash and other characteristic symptoms.

5. The complications which arise.

6. The paths by which the poison is given off, and how long it continues to be so given off, *i.e.* the duration of the infection.

A knowledge of the duration of the periods of incubation and infection is all-important in the prevention of the spread of the disease, and owing to the labours of the Clinical Society of London these are now fairly accurately known in the majority of the common diseases.

Two questions are constantly asked by parents and schoolmasters: (1) 'When a boy has been exposed to infection how long must he be isolated from his fellows?' The answer is, 'Until the full period of incubation (of the disease in question) is over, dating from the *last* time he was exposed to infection.'

(2) 'When a boy has been suffering from infectious disease when may he rejoin his fellows?' The answer to this question depends upon whether the disease has been simple, or with complications, points which will be dwelt upon under the particular diseases.

As a practical illustration of the questions which so often arise in infectious disease, let us take the hypothetical case of three children, whom we will name 'Tom,' 'Dick,' and 'Harry,' members of the same household.

On Saturday, June 1, the three boys attended a school-treat.

Tuesday, June 4. Tom seemed feverish, vomited, and complained of sore throat and headache.

Wednesday, 5th. A bright red rash noticed on Tom's neck and chest. A doctor saw him and pronounced it scarlet fever, and he was immediately isolated, but as Dick and Harry were possibly infected, they were rightly not sent out of the house.

Saturday, 8th. Dick vomited and complained of sore throat (probably infected by Tom on the 4th or 5th), and was immediately separated from Harry.

Sunday, 9th. Dick developed the rash.

Now as the period of incubation of scarlet fever varies from two to eight days, and Harry might have been infected by Dick on Saturday the 8th, he could not be safely removed to another house until eight days had elapsed, *i.e.* the 16th. He was then

removed, but as it was possible, though not probable, that he had contracted the disease by being in the same house with his brothers, though isolated, he was not allowed to return to school for another eight days, June 24.

Tom had uncomplicated scarlet fever, and finished peeling six weeks after the appearance of the rash. He was then disinfecting, but not allowed to return to school for another two weeks, July 31.

Dick suffered from ear trouble, and though he finished peeling about the same time as Tom, was not allowed to rejoin his fellows until the discharge from the ear had ceased, August 31.

Scarlet fever or scarlatina.—It is a common error to think that scarlatina means mild scarlet fever. The two terms have precisely the same meaning.

Characteristics.—A fever starting with headache and sore throat, often vomiting, rapidly followed by a rash, gradually forming a continuous scarlet blush; followed by peeling.

Infection is conveyed (1) by the breath and minute particles of the skin of scarlet fever patients, who are infectious from the onset of the disease, until the process of peeling has ceased; (2) by clothing, books, and toys used by such patients; (3) by contaminated milk.

Period of incubation.—Usually two or three days; it may be as short as twenty-four hours, or as long as eight days, though this is rare.

Invasion is marked by the signs of fever, with sore throat, headache, and vomiting. Severe headache, repeated vomiting, and convulsions are grave signs. From twenty-four to thirty-six hours after the invasion the rash appears on the neck, chest, or upper arms, and the tongue becomes thickly coated with white fur, the papillæ usually showing as minute bright pink spots.

The *throat* is usually much swollen, and intensely red, but there may be only slight redness; the tonsils may be studded with white spots, or covered with exudation, causing the disease to be mistaken for tonsillitis or diphtheria; the tonsils may ulcerate. There is usually some enlargement of the lymphatic glands beneath the angles of the jaw.

The *rash* takes the form at first of minute pink spots, which rapidly run together, and form a continuous scarlet blush, gradually extending from the chest downwards to the legs; it reaches its greatest intensity on the fourth day of illness, and usually disappears at the end of a week.

The *aspect of the face* is peculiar: the cheeks and lips are bright red; the skin round the mouth and on the chin is usually unaffected, and looks very pale in contrast.

The *tongue*, as soon as the rash is fully developed, begins to peel along the tip and edges, which look rough and red in contrast with the back, which may remain coated for a considerable time.

The *temperature* rapidly rises at the onset of the disease, reaches its maximum, 103° – 104° , on the third or fourth day, and in favourable cases gradually declines and falls to normal at the end of the week.

Peeling begins first on the face, as a fine powder; on the rest of the body the skin may separate in large flakes. The palms of the hands and the soles and heels are usually the last to peel completely. This usually takes from six to eight weeks.

Complications.—(1) Inflammation of the eustachian tube and middle ear, (2) of the glands of the neck, (3) rheumatic affections of the heart and joints, (4) inflammation of the kidneys, which most often occurs about the beginning of the third week.

Other forms of scarlet fever.—1. Mild cases are often seen during epidemics which are difficult or impossible to recognise, such as cases of sore throat with slight constitutional disturbance, and a rash which only lasts for a few hours, or no rash that can be detected. Such cases must be isolated and carefully watched for the onset of peeling, as they are capable of imparting severe scarlet fever to others.

2. Malignant forms. In some the symptoms of invasion are very severe, and the temperature may rapidly rise to 106° or 108° , and the patient become comatose and die before the rash has fully developed. In others the fever may be of the asthenic type from the first, and extensive ulceration of the throat occur with little or no fever, and the patient rapidly sink and die from exhaustion.

Scarlet fever is most often mistaken for tonsillitis, diphtheria,

measles, and German measles. The rash which sometimes follows the injection of an enema closely resembles the eruption of scarlet fever.

Treatment.—Bed for a fortnight; young children who play on the floor should be kept three weeks in bed; indoors for another week, and if the weather be mild and the patient can be kept from coming in contact with other people, he may then be allowed to go out. Great care must be taken against catching cold. During fever the diet should consist of milk and barley-water, or milk and soda-water, and lemonade may be given freely. The reasons may be more theoretical than practical, but beef-tea and meat-juices are best withheld in the early stages. Our treatment should be mainly directed to relieve the throat symptoms, and enable the patient to swallow nourishment freely. Small pieces of ice may be sucked, warm fomentations applied round the neck, and the throat sprayed with boracic or Condy's fluid. Chlorine gargle may be used as a spray if there is much exudation or ulceration of the tonsils. Medicines have little influence on the course of the disease, and are not called for in mild cases; regulating the bowels with saline aperients is sufficient. The body should be sponged twice daily with Condy's fluid diluted with warm water.

In malignant cases, strength must be supported by stimulants, and carbonate of ammonia is useful. High fever must be treated by cold packs; cold baths are best avoided in this disease. The occurrence of ear trouble requires prompt treatment by skilled hands. The quantity of urine secreted must be carefully noted, and if it becomes scanty and high coloured, or smoky, the treatment described for acute nephritis must be adopted. When peeling begins the skin should be daily anointed with carbolic oil, which is then washed off in a warm bath. Blocking the pores of the skin, by leaving oily applications on the surface, should be avoided.

Period of isolation.—Two months dating from the invasion. The patient is probably infectious so long as there is any trace of roughness of the skin or any discharge from the ears or nose.

Measles.—*Characteristics.*—Fever with catarrh of the eyes and nose, and a rapidly spreading eruption appearing on the fourth day of illness.

Infection is almost invariably conveyed by personal contact; the patient is highly infectious from the first day; usually ceases to be so after three weeks. Books, clothing, &c., can convey the infection, but rarely retain it for long.

Period of incubation, usually ten days; may be as short as five, or as long as fourteen days.

Invasion is marked by a feverish cold with running from the eyes and nose, tickling in the throat, and frequent hacking or hoarse cough. The patient feels chilly, is irritable and peevish, his eyes ache, and he dislikes the light. If the throat is examined the soft palate may be found swollen and mottled with red patches.

On the fourth day of illness, usually in the morning, a rash is noticed behind the ears, or on the forehead at the roots of the hair, which rapidly spreads on to the face and neck, and then gradually invades the body and limbs. The rash at first consists of small, round, pink spots, but these tend to run together and form blotches like irregularly shaped crescents; these are best seen on the chest and abdomen. The eruption lasts from four to six days.

The *temperature* is usually high on the first day of illness, is rather lower on the next two days, and then rapidly rises and reaches its maximum (103° – 105°) on the appearance of the rash, and declines as the rash fades.

The *catarrh* usually extends along the mucous membranes, so that bronchitis and diarrhoea are both common.

Peeling usually takes place to a limited extent; the particles of skin are very small.

Complications.—(1) Laryngitis, bronchitis, and pneumonia; (2) diarrhoea; (3) inflammation of the eustachian tubes and ears; (4) styes of the eyelids and ulcers of the cornea.

Other forms of measles.—1. Mild; during epidemics cases of slight fever, catarrh, and diarrhoea with rash only lasting two days are met with. 2. Cases with severe congestion of the internal organs and ill-developed skin eruption. The fever is high, the pulse weak; delirium and convulsions may occur, and the patient rapidly sink.

Measles may be mistaken for (1) a common feverish cold, (2) German measles, (3) scarlet fever.

Treatment.—Bed for a fortnight, even in mild cases, indoors

for another week. The temperature of the room should be kept at 65° F. Treatment should be directed to protect the eyes and relieve the cough and chest affections. The bed should be placed so that the patient has his back to the light; a cloth or rug of dark material may be hung up at the end of the bed, but the room should not be darkened. A steam-kettle containing eucalyptus oil or compound tincture of benzoin relieves the cough. The body should be sponged with warm water twice a day. The diet should be fluid; lemonade, barley-water, and black-currant tea may be freely sipped. Medicines are not required in mild cases, but a diaphoretic, containing a few drops of ipecacuanha wine, may be given. If the fever is high and the eruption scanty, sponging with warm water, or hot packs. In severe cases accompanied by feeble pulse and convulsions, the hot mustard bath is useful, and stimulants should be given. The eyes should be frequently bathed with boracic solution, and the same used as a throat-spray diminishes the liability to ear trouble. Constipation should be relieved by castor oil or magnesia, but diarrhœa is readily set up and often difficult to check; if it occurs, the milk should be well diluted with lime-water, and Dover's powder, in small doses, may be given to children over three years of age. Bronchitis must be treated on general lines.

Period of isolation.—Three weeks, but the patient should not mix with other children until all cough has ceased.

German measles, rubella, or rōtheln.—*Characteristics* closely resemble mild measles, but it is a distinct disease. The catarrh is slight, and followed by the appearance of a rash within twenty-four hours.

Infection is probably conveyed solely by contact. It is very doubtful whether clothes can communicate the disease.

Period of incubation, usually eighteen days; may be as short as five, or as long as twenty-one days.

Invasion.—Slight catarrh and cough, with headache; sometimes sore throat and vomiting; followed by a rash in twelve or twenty-four hours. Symptoms often so slight as to escape notice altogether.

The rash is often the first thing noticed, and appears behind the ears or about the nose and mouth, rapidly extending on to

the body and limbs. It is commonly blotchy and irregular, often resembling the rash of measles in one part of the body, that of scarlet fever in another, but it is rarely such a vivid red. It begins to fade in about twelve hours, and is gone in three days. There is often peeling in very fine branny scales.

The *temperature* may be normal throughout, usually about 100°, and rarely reaches 102°; it falls to normal as the rash disappears.

The *lymphatic glands* about the body are slightly enlarged almost invariably, and can be felt in the neck, the armpits, and the groins.

Complications.—Practically none; slight bronchitis may follow. There is often anæmia and general weakness during convalescence, out of proportion to the severity of the disease.

German measles *may be mistaken for* (1) measles; (2) scarlet fever.

Treatment.—Confinement to bed whilst the rash lasts, indoors for another week. The sore throat and cough may require treatment, otherwise no medicines are needed.

Isolation.—Three weeks, dating from the appearance of the rash.

TABLE SHOWING THE DIFFERENCES BETWEEN

	Scarlet fever	Measles	German Measles
Incubation .	Usually 2–5 days.	5–14 days.	Usually 18 days.
Invasion .	1–2 days. Head-ache, sore throat, vomiting.	3–4 days. Cold in the head. Sore eyes, cough.	1 day, often none. Slight catarrh and sore throat.
Rash . .	2nd or 3rd day. Minute pink dots, first appearing on neck, chest, or arms, running together and forming a bright red blush.	4th or 5th day. Spots first noticed behind ears or on forehead. Tend to form crescent-shaped blotches.	2nd day. Spots about ears, nose, and mouth; tend to form irregular blotches of varying extent on rest of body.
Peeling .	Almost constant; often large scales and flakes	Often occurs; fine scales.	Often absent; very minute scales.
Other characteristics	The aspect of the face. The tongue.	Peevishness, dislike to a strong light.	Slight sense of illness with much skin eruption. General enlargement of glands.

Small-pox or variola.—*Characteristics.*—Fever, attended with severe headache and vomiting, diminishing or disappearing on the appearance of spots on the face and wrists, about the third day, but returning on the eighth day, when the spots become blebs filled with pus.

Infection by direct contact, by clothing, conveyed by a third person, and retained for an indefinite time in bedding, &c. Unlike most microbes, which are rendered innocuous by exposure to fresh air, the poison can be conveyed in an active state by the wind for a distance of three-quarters of a mile. Patients are infectious from the outset until the skin has become sound.

Incubation.—Usually twelve days; may be as short as nine, or as long as twenty-three days.

Invasion.—Intense headache and severe pain in the back and thighs, with rigors or convulsions. Usually severe vomiting, and often intense pain in the abdomen, with marked prostration. Blotches of redness may be noticed on the abdomen and thighs.

Rash.—On the third or fourth day of illness spots appear on the upper part of the forehead and on the wrists, which rapidly become raised and hard, like shot beneath the skin; during the next three days they appear in the mouth and throat, on the trunk and limbs. After being in existence two days (fifth or sixth day of illness) the spots become blisters, each about the size of a split pea, with a central depression on the top of each. During the next two days the fluid becomes pus, and each bleb is surrounded by an angry red ring (seventh or eighth day of illness). They then gradually dry up and form scabs, which are shed after about a week.

Temperature.—There is high fever (104° F.) at the onset, but this begins to fall as soon as the rash appears, and may even touch the normal point. At the same time all the constitutional symptoms greatly diminish, and in this lies the danger; the patient often gets up, goes about his work, and conveys the disease to unprotected persons with whom he comes in contact. He is again struck down by fever on the seventh or eighth day, when the contents of the blisters become pus, and he is once more seriously ill, the temperature rising to 104° or 105°, with intense restlessness, often delirium, and difficulty in breathing

and swallowing. As the blisters dry up the fever and symptoms subside in favourable cases.

Complications.—(1) Laryngitis ; (2) bronchitis and pneumonia ; (3) affections of the nervous system ; (4) ulceration of the eyes ; (5) abscesses and erysipelas.

Other forms of small-pox.—The above description applies to mild cases, but the disease frequently takes the form of (1) confluent small-pox : the skin becomes enormously swollen, and the blisters run into one another. The features can hardly be recognised as those of a human being. Blindness and terrible disfigurement commonly remain with those who escape death from delirium and exhaustion. (2) Black small-pox is marked by severe early symptoms, bleeding from the gums, and extravasations of blood like bruises about the body. It is invariably fatal. (3) Modified small-pox occurs in persons who have had a previous attack (rare), or have been inefficiently vaccinated. The initial symptoms resemble those of unmodified small-pox, and may be quite as severe, but when the rash appears the temperature falls to normal, and rarely rises again to much above 100°. The spots are usually not numerous, and after the first have appeared, the remainder follow within twelve hours. They mature rapidly and become blisters in about twenty-four hours (many disappear without doing so), and usually dry up and form scabs in about six days. There is hardly any constitutional disturbance, the patient eats and sleeps well, and is convalescent at the end of a fortnight.

Small-pox may be mistaken in the early stages for (1) poisoning, or peritonitis, when the abdominal pain and vomiting are severe ; (2) for influenza ; and later, when the eruption has appeared, for (3) chicken-pox.

Treatment.—Patients suffering from this loathsome disease should be immediately removed to a hospital, and every member of the household in which it arises should be vaccinated with the least possible delay. When removal is impossible, the most strict isolation must be enforced, and after the termination of the illness the bedding and clothing should be destroyed. The treatment presents almost insurmountable difficulties unless in a special hospital. Dover's powder may be given in the early stages to relieve pain. The patient should be frequently sponged, and may be anointed with carbolic oil or vaseline to modify the

scarring. The eyes should be constantly bathed with boracic lotion, and the same used as a spray for the throat. The delirium is but little influenced by drugs, and the condition of the skin makes physical restraint almost impossible. Salines should be given to relieve constipation. The strength must be supported by a free supply of fluid food, and alcohol is required in the later stages.

Period of isolation.—Until all the scabs have fallen off and the skin is left free from scales.

Vaccination.—With ordinary care in selecting lymph, due regard to cleanliness in performing the operation, and subsequent protection from irritation, vaccination has been conclusively proved to be practically free from risk to a healthy child. Its efficacy in preventing the hideous disease, small-pox, if systematically carried out, is such that we are apt to forget the scourge once so prevalent, and ever ready to return if vaccination is neglected.

Time of vaccination.—During small-pox epidemics babies should be vaccinated without loss of time. When there is no urgency, the end of the second month is best. The child is then more vigorous, and gets over vaccination before the onset of teething. If it fails to take, it should be repeated at intervals of one month until successful; re-vaccination should be performed at intervals of ten years at least.

Method of vaccination.—It has been proved beyond doubt that the number of marks has a distinct bearing on the protection afforded. A wise parent, with a proper regard for her child's safety, should insist upon at least four marks. The arm should first be washed with warm soap and water, and rubbed dry with a soft clean towel. The lymph is then placed on the arm in four or five spots about one inch apart. A large needle, thoroughly cleansed by passing the point through the flame of a spirit-lamp or candle, is as good an instrument to use as any. The skin is then scratched in fine cross lines at each spot, sufficiently deeply to penetrate the upper layers of the skin without drawing blood. The lymph should be allowed to dry before the arm is covered up.

Course of vaccination.—Usually on the third day (often later if calf lymph is used) a pink spot appears at each in-

oculation. On the fifth and sixth day a bleb forms, depressed in the centre.

From the eighth to tenth day there is a red zone round each bleb, which may extend from the shoulder to the elbow. The blebs then begin to dry up and the redness to fade; scabs form about the fifteenth day, which drop off after about another ten days, leaving a circular depressed scar. There is often feverishness from the fifth to the tenth day, and swelling of the glands in the armpit.

Treatment.—The child should not be exposed to cold or wet whilst fever is present, and the arm protected from injury and dirt. Arm shields are usually harmful, as they slip, and the hard edge damages the blebs. Warm boracic fomentations relieve the redness and swelling, and as this subsides, dusting with boracic powder, and a pad of dry absorbent wool, is a good dressing. Boracic ointment may be used, but greasy applications appear rather to aggravate the inflammation than relieve it.

Ill-effects from vaccination are now extremely rare. In ill-nourished and neglected children, ulceration sometimes occurs at the points of inoculation, and like all wounds they may become contaminated by dirt. Vaccination has to bear the blame of most childish ailments, affections of the skin, lungs, and intestine. The children of anti-vaccinators, however, do not escape these diseases which are common to all children, vaccinated or not, about the period of teething. Some parents appear to find comfort in attributing the ailments of their offspring to any cause rather than some inherited predisposition, or maternal neglect.

Chicken-pox, varicella, glass-pox.—*Characteristics.*—Slight feverish symptoms with almost simultaneous appearance of spots, rapidly changing into blebs, which occur in successive crops.

Infection by direct contact, by infected clothes, or conveyed by a third person. The infection lasts from the appearance of the rash until the skin is free from scales.

Incubation.—Almost constantly fourteen days; as short as ten or as long as seventeen days are the limits.

Invasion.—There may be no signs of illness before the spots

are noticed, but there is usually chilliness, and occasionally vomiting and pains in the back and legs.¹

Eruption appears within twenty-four hours, almost invariably on the back and chest, occasionally on the face and limbs. It may be preceded by patches of red rash on the skin. The spots are raised and red at first, but rapidly develop into blebs, circular or oval in shape, and about the size of a split pea. They are rarely dimpled like those of small-pox. The contents of the blebs are clear at first, but gradually become pus at the end of forty-eight hours; they then begin to shrivel and form dry scabs on about the fourth day, which drop off after a week or a fortnight. Successive crops appear as a rule during the first four or six days, and are distributed most plentifully on the trunk and scalp, less abundantly on the limbs. There is usually considerable itching, and the throat may be uncomfortable from the spots on the palate.

Temperature may be normal throughout, but there is usually slight fever, 100° to 102° (rarely above), for the first three or four days.

Complications.—The spots sometimes ulcerate in ill-nourished children.

Chicken-pox may be mistaken for small-pox, particularly the modified form.

Treatment.—The disease is very mild as a rule, but bed and light diet should be enforced whilst the spots are appearing. The child should be prevented from scratching and picking the scabs. Carbolic oil or boracic ointment rubbed on each spot allays the irritation.

Isolation until the skin is quite smooth and free from scales, usually three weeks.

[For Table showing the differences between small-pox, modified small-pox, and chicken-pox, see next page.]

Enteric, typhoid, or gastric fever.—*Characteristics.*—The onset gradual, frequently insidious, followed by a continuous fever, usually lasting three weeks. An eruption, often difficult to detect, appears in the early part of the second week. Intestinal disturbance, due to ulceration of the small intestine, marked by

¹ In rare cases these symptoms are noticed for three or four days before the appearance of the eruption. Such cases are most gravely suspicious, and extremely difficult to distinguish from small-pox.

TABLE SHOWING THE DIFFERENCES BETWEEN

	Small-pox.	Modified Small-pox	Chicken-pox
Invasion . .	High fever and severe symptoms for 3 days.	Ditto.	Slight feverish symptoms for a few hours; often absent.
Eruption . .	On 3rd or 4th day. On forehead and wrists. Blebs, always dimpled at first, on 5th or 6th day.	Ditto. Ditto. Blebs, dimpled, form in about 24 hours.	On 1st-2nd day. On chest and back. Blebs, rarely dimpled, within 12 hours.
Temperature	Falls rapidly when eruption appears. Secondary rise on 7th day.	Falls rapidly when eruption appears. Little or no secondary fever.	Fever, if present, does not fall when eruption appears. No secondary fever.

abdominal pain; diarrhœa most frequently, but constipation is often met with.

Infection is conveyed by (1) the stools of typhoid patients, which become more virulent after leaving the body, the expectoration, and the urine; (2) water, milk, and raw articles of food, oysters, salads, and watercress contaminated by typhoid excretions; (3) dried excretions disseminated as dust in the air; (4) foul gas from sewers.

Incubation.—Most often twelve or fourteen days; may be as short as four days, or as long as four weeks (rare).

Invasion.—Frequently insidious. Loss of appetite, weakness, sleeplessness, headache, pains in the back and legs, often nose-bleeding. There may be severe diarrhœa and vomiting, cough, delirium, or convulsions. The temperature rises gradually, the tongue becomes furred, the abdomen somewhat distended and tender, and the bowels either loose or constipated. These symptoms gradually increase, and the patient commonly takes to his bed about the third or fourth day.

The rash usually appears about the eighth day of illness: circular, slightly raised pink spots, scattered over the abdomen and back, often few in number, and they then easily escape notice. They usually come out in successive crops until the beginning of the third week, but the individual spots fade after two or three

days, leaving a faint stain in the skin. During this period (the second week of illness) all the symptoms are well marked. The respirations are rapid, and cough is frequent and troublesome. The abdomen is swollen and tender, especially in the ileo-cæcal region, and gurgling may be both felt and heard. Diarrhœa is now usually a marked symptom; the stools are pale yellow, closely resembling pea-soup, both in colour and consistency. The spleen may be felt to be enlarged by a skilled hand. The temperature is now continuously high. The patient looks dull and heavy, with a pale face, dry lips and tongue, and the teeth coated with dry mucus. There is usually great loss of flesh.

During the third week the symptoms begin to subside in favourable cases, but it is an anxious time, owing to the great exhaustion which is almost invariably present, and the complications which may occur.

Temperature.—During the first four to six days the temperature rises in a peculiar way, increasing daily by a considerable evening rise, though there is a slight fall each morning. Thus, on the third day the temperature may be 100° in the morning, 102° in the evening; fourth day, 101° A.M., 103° P.M.; fifth day, 102° A.M., 104° P.M. During the next week or ten days the temperature remains continuously high, though there is usually one degree less fever in the mornings than in the evenings. In the third week, in favourable cases, it subsides, the temperature being only slightly above normal in the mornings, but with a marked though gradually decreasing evening rise, becoming normal in the fourth week.

Complications.—These are very numerous, and some occur so frequently that they may be regarded as an accompaniment of the disease. Only the more common are mentioned. *Lung trouble*, in the form of bronchitis, almost always exists to a greater or less degree, and pneumonia often occurs. *Swollen belly*, from distension of the intestines with gas, is a frequent symptom. *Bleeding from the bowels* and *perforation of the intestine*. *Acute nephritis*. *Bleeding from the nose*, so common in the early stage, may give trouble throughout the illness. *Plugging of the veins*, most often occurring in the left leg. *Bed sores*.

Relapse.—When a patient is apparently convalescent, it

sometimes happens that the temperature begins to rise again, spots reappear, and the other symptoms return.

Other forms.—The above description applies to an ordinary case of moderate severity. It may take a mild course, the symptoms disappearing and the temperature becoming normal at the end of the second week. In some cases the symptoms are so slight that the patient continues his work until sudden and fatal complications, such as hæmorrhage or perforation, occur. Grave forms of the disease are often characterised by the early onset of violent delirium and high fever.

Enteric fever may be mistaken, (1) when the nerve symptoms such as delirium and headache, are severe, for influenza, inflammation of the brain, or insanity; (2) when the lung complications are well-marked, for pneumonia; (3) when diarrhœa sets in early, for gastro-intestinal catarrh; (4) for typhus, a disease now rarely met with in England; (5) for puerperal septicæmia.

Treatment.—Unless proper care is taken, the attendants on the sick are very liable to contract the disease, or it may be spread amongst other members of the community.

The following rules should be observed:—

1. Some strong disinfectant, such as carbolic acid (1 in 20), should be placed in the bed-pan before being used by the patient; and after use a further addition should be made to the contents. The bed-pan should be then covered up, and allowed to stand before being emptied in the water-closet; urine and expectoration should be dealt with in the same way.

2. To prevent the sheets from becoming soiled, a mackintosh covered with a cloth should be placed under the bed-pan, and not removed until the buttocks have been thoroughly cleansed with rag soaked in weak carbolic or Condy's fluid. This rag should be burned. If the under sheet become soiled, it must be immediately removed and soaked in carbolic (1 in 20).

3. The nurse must dip her hands in disinfecting solution immediately she has finished handling the bed-pan, &c. She must never eat anything in the sick-room, and before retiring to take a meal she must scrub her hands in hot soap and water, and dip them in disinfecting solution.

General hygiene of the patient.—If possible there should be two beds, so that the patient can be lifted from one to the other

after sponging, wet-packing, and the like. From the first the utmost care must be taken against the formation of bed sores.

The mouth should be frequently washed out with boracic lotion, and the lips and gums sponged with the same if the patient is unconscious. The body should be sponged twice a day with vinegar and water. He must not be allowed to get up and use the night-commode until convalescence is fully established. When delirious, he should not be left alone, as typhoid patients are particularly prone to make sudden attempts to escape, often by the window.

Diet.—In no disease is recovery more dependent on a proper diet. We must remember that the small intestines are the seat of ulceration, and that the powers of digestion and absorption are both seriously impaired. Until the ulcers have healed, the administration of anything approaching the nature of solid food is fraught with danger. It requires much fortitude to resist the entreaties of a convalescent patient, but solid food should not be given for at least *ten days after the temperature has been normal*. Milk is the best form of food, three pints being given in the twenty-four hours, and always diluted with lime, soda, or barley water. The stools must be carefully watched for undigested curds. If present, beef-tea and meat juices may be given alternately with the milk, or the milk may be peptonised. Broths made with vegetables, and carefully strained through fine muslin, relieve the monotony of milk, but these are best withheld if there is much diarrhoea, and peptonised milk, meat juices, whey, or whites of eggs and water should be employed. Iced water, lemonade, orange-juice and water, and ‘Imperial drink’ may be freely given, provided the diarrhoea is not excessive, when all vegetable preparations must be used with caution. Coffee-whey and milk-tea make an agreeable change. Potato-soup and egg-jelly may also be given. Stimulants are not necessary in the early stages, when the patient is young and strong, but when the temperature is high, the tongue brown and dry, with feeble pulse and a muttering delirium, they are urgently called for. They are best given mixed with food in the form of wine-whey, egg-nog, &c. (see SICK-FEEDING). When the temperature has been normal for ten days such food as custard pudding and bread-and-milk may be tried with

caution, but fluid food immediately returned to if there is any pain or rise of temperature.

Treatment by medicines.—No specific is known, and though the administration of calomel may be justifiable in the hands of a physician, such treatment practised by the unskilled would probably result in disaster. Quinine, grs. 2 in milk, or dilute hydrochloric acid, $\text{m}20$ in water $\text{℥}1$, may be given three or four times a day. The special symptoms may be treated as under.

1. Pain and distension of abdomen: hot turpentine fomentations.

2. Severe diarrhoea: substitute meat-juices for milk, and give a starch and opium enema.

3. Constipation: if present for more than two days, soap and water enema.

4. Vomiting: peptonised milk, meat-juices or whey.

5. Bleeding from the bowel: restrict the food; ice may be sucked; small quantities of whey or white of egg and water. Give a full dose of opium; keep the patient at rest; do not lift him on to a bed-pan, but let him pass motion into cloths that may be destroyed.

High temperature.—Cold sponging and cold packs, combined with quinine in doses of 10 grains. Cold baths are without doubt most efficacious, but require skilled supervision and several helpers.

Period of isolation.—The stools should be considered infectious for at least two weeks after convalescence is fully established.

Typhus fever.—A comparatively rare disease, arising in the filthy and overcrowded dwellings of the poor, usually in times of famine and war. The period of incubation is about twelve days. The poison is given off by the breath, perspiration, and evacuations, and can be conveyed by clothes. The onset is marked by a rigor, severe headache, and pains in the back and limbs, often violent delirium, vomiting, and great prostration. On the third or fifth day a rash, at first resembling measles, appears on the sides of the chest and abdomen, and then extends over the limbs and trunk. The spots are dirty pink, and become dark red or blue, and when pressed by the finger only partially disappear, owing to extravasated blood in the skin. The course of the disease is marked by increasing prostration

and incoherent delirium. Improvement may suddenly commence at the end of the second week and the patient get well. Many perish from lung complications.

Treatment.—Abundant fresh air. In other ways like that of typhoid.

Typhus may be mistaken for typhoid fever. The sudden onset, the early appearance of a rash, which is a dirty pink colour at first, changing into a dusky red or blue, staining the skin, and the rapid fall of temperature in favourable cases, are characteristic of typhus, and serve to distinguish them.

CHAPTER II

INFECTIOUS DISEASES, USUALLY WITHOUT SKIN ERUPTIONS

Tuberculosis or Phthisis—Influenza—Dengue—Diphtheria—Mumps—Whooping-cough.

Tuberculosis, tubercular disease, or phthisis ('consumption').—This disease is due to a microbe, the tubercle bacillus, which causes inflammation in the tissues of the body, and the formation of minute nodules or tubercles, from which the name of the disease is derived. The microbes exist in the expectoration and discharges of consumptive people, in the milk of diseased cows, and the flesh of tuberculous animals is infectious under certain conditions. They enter the body (1) through cracks or sores in the skin; (2) by being swallowed; (3) by being inhaled with the air; (4) and occasionally are developed in the infant previous to birth. Like all microbes, they cannot produce the disease unless the body is in a suitable condition for their growth. The vitality of the tissues must be lowered for the microbes to obtain a foothold. A clean cut, properly treated, rarely becomes infected, neglected sores in weakly children frequently do; healthy lungs and intestines are not a suitable soil, but a neglected cold or other inflammatory affection of these organs may put them in a condition favourable for the development of the microbes. The predisposition to tuberculosis is very great in some families, but there is no reason why they should develop the disease provided that their surroundings and mode of life are healthy.

Varieties and course of tuberculosis.—When infection has taken place, the course of the disease largely depends on what part of the body is affected, and the general health of the patient. Tuberculous affections may be roughly classed in two groups. (1) Those of internal organs, such as the brain, lungs, or intestine. (2) Those of external organs, including the skin, bones, and joints.

When internal organs are affected, the general health suffers owing to the vital functions, such as respiration or digestion, being impaired, and the progress of the disease is therefore favoured. This is markedly the case when the intestine is involved. On the other hand, when the disease is limited to external structures there may be no marked affection of general health, and the patient may appear plump and well until the disease is far advanced. It is to these external manifestations of tuberculosis that the terms 'strumous' or 'scrofulous' disease are sometimes applied, and at the present day some physicians still believe that they are distinct from tuberculosis. Without going deeply into the question, the fact that strumous children are so often the offspring of tuberculous parents, that they frequently ultimately die of tuberculous disease of the brain, lungs, or intestine, that some members of one family are consumptive, others are strumous, and that sufferers from tuberculosis of internal organs occasionally develop typical strumous joints, is strong evidence of the diseases being due to the same cause.

The *symptoms* of internal tuberculosis vary according to the organ affected, and whether the disease runs an acute or chronic course. In the majority of cases the onset is insidious, and the disease is first suspected by the patient suffering from some chronic disorder, such as cough or slight diarrhoea, with general weakness, loss of flesh, anæmia, and a slight rise of temperature towards evening. As the disease progresses the symptoms of hectic fever (see p. 96) become marked, emaciation and night-sweats being particularly noticeable, and may be present for some months before the termination of the illness. Acute tuberculosis, or 'galloping consumption,' often occurs during convalescence from, or directly supervenes on, some acute illness, such as pneumonia, measles, or typhoid fever. In these cases the temperature is continuously high, or marked by only a slight morning fall, and it is often difficult or impossible to distinguish them from acute inflammatory disease due to other causes.

Tuberculosis of external organs usually runs a chronic course. The symptoms which arise when a joint is affected are described under the heading of DISEASES OF JOINTS. When the skin is attacked, there is chronic inflammation and thickening, followed by slow and spreading ulceration in many cases.

This is particularly common in ill-nourished children and feeble old people.

Process of cure.—Tuberculosis may occur in varying degrees of severity. Many patients are seen who have obviously suffered from the disease, and who stoutly deny that they ‘have ever been ill in their lives,’ and who certainly have undergone no special treatment. If the vitality of the tissues improves the microbes are rendered inert; the mischief they have inflicted may remain like a scar, but provided that no considerable area has been affected no perceptible impairment of health may result. The signs of returning health are (1) the patient begins to put on flesh and regain his normal weight; (2) the muscles regain their strength; (3) the temperature falls to normal; and (4) the special symptoms such as cough or diarrhœa gradually subside.

Treatment.—No drug which can directly kill the microbes in the tissues of the body is yet known. A very large number of tuberculous patients recover by simply paying careful heed to the laws of hygiene; pure air, nutritious food, and rest of the affected part, sums up the treatment.

1. Pure air: a sunny, dry atmosphere without great variation of temperature should be sought for. Constant, still, bright cold is preferable to great heat. Exposure to cold winds should be guarded against, but the patient should live out of doors as much as possible, and the bedroom should be cool and fresh, but without draughts. A warm, damp, sunless atmosphere is the worst, sea or moorland air is the best.

2. Food: animal diet is preferable to vegetable. Milk, eggs, fish, the digestible forms of meat, and the animal fats, cream and butter, should be freely given. Cod-liver oil is an easily digestible form of fat, but it must on no account be given if it causes nausea or disgust for other food. It can rarely be taken during hot weather, and should always be given after food. Regulating the digestion and the action of the bowels is all-important. The tincture of nux vomica with hydrochloric acid given after a meal helps the digestion of animal food and increases the appetite for the next meal. A saline draught may be given in the mornings if there is a tendency to constipation. If diarrhœa occurs, the food must be limited to the most digestible forms; if curded milk or particles of undigested food are noticed in the stools, an aperient, such as a small dose of castor

oil, should be given, followed by bismuth, or a starch and opium enema may be injected. It may be necessary to peptonise the food. Patients with disease of the lungs must be warned against swallowing mucus or other matter they cough up into the mouth, as it may give rise to infection of the intestine. It should be immediately spat out into a suitable vessel.

3. Rest of the affected parts: gentle exercise is allowable in the majority of cases, but any exertion which causes breathlessness must be avoided, particularly if the lungs are affected. When there is disease of the intestine, absolute rest must be enforced and the diet carefully attended to. Diseased joints should be supported by some form of splint, and an arm should be placed in a sling. It is particularly important in treating children to devise some means of giving rest to the parts diseased, and at the same time allow them to get about.

Preventive treatment.—Members of tuberculous families are less likely to be attacked if they lead healthy outdoor lives and avoid ill-ventilated rooms, particularly at night. Milk should be scalded, animal food thoroughly cooked. The expectoration and discharges of patients should be received in vessels containing disinfectants, and frequently emptied. A healthy person should not sleep in the same room with the sick. If these precautions are observed there is little or no risk to the attendants.

Note.—There is hardly a tissue in the body which may not become the seat of tuberculous disease, though some are rarely attacked primarily. The more common manifestations, with their treatment, are dealt with under the diseases of the special organs.

Influenza.—This disease has been more or less prevalent since the latter end of 1889. There has been a striking alteration in the general symptoms from year to year, and it is impossible to describe any one group as being characteristic. That one attack appears to predispose to another, and that more or less nervous prostration always follows, are marked features. It is often only possible to recognise the disease by the after-effects. To attempt to describe the peculiar features of each of the numerous epidemics would be futile, as the disease may possibly never assume the same form again. Brief mention is made of the prominent symptoms of the first epidemic (1889), and of

those which are noticeable at the present time (1897). The period of incubation is probably from two to five days. The infection is but imperfectly understood. It is probably given off by the breath and expectoration from the beginning of the illness until all cough has ceased, and is most active in close, ill-ventilated rooms.

Symptoms (1889).—Sudden onset of severe headache and pains in the back and limbs, sometimes preceded by vomiting, a rigor, or, in children, delirium and convulsions. The tongue rapidly became flabby, and coated with thick creamy fur. The eyeballs ached, were tender when pressed, and the lids were congested. The blood-vessels of the whites of the eyes were enlarged, giving them a pink appearance. There was sore throat and frequent hacking cough, which no remedy appeared to relieve. Profuse perspirations occurred without relief from the general discomfort, imparting a peculiarly offensive acid odour. The temperature rapidly rose to 103° or 104° , and usually fell on the fourth day, whatever treatment was adopted. In most cases the cough continued for a week or a fortnight without any other signs of lung affection which could be detected. Bronchitis and pneumonia were common complications in the aged, the very young, and intemperate people. Rashes were occasionally noticed. All suffered from depression and muscular weakness out of proportion to the duration of the illness, particularly those who had refused to be, or could not be, treated in bed.

At the present time (1897) the disease is preceded by chilliness and malaise for twenty-four or forty-eight hours, followed, in many cases, by profuse running from the eyes and nose, closely resembling the onset of measles. In others there is marked digestive disturbance with vomiting and profuse watery diarrhœa. Marked elevation of temperature is not frequent; from 100° to 101° is common, above 102° is rare. The cough is as intractable as ever. Considerable weakness is left, and the pulse continues rapid but feeble after the fever has departed. Perversion of palate is almost a constant after-effect; there is not actual loss of the sense of taste, but wine seems sour or corked, meat tainted, milk and eggs have a musty flavour.

Complications.—To give a complete list would entail

enumerating most of the ills that flesh is heir to. Bronchitis, pneumonia, and heart failure are the most common cause of a fatal termination in old people. Pleurisy, developing into empyema, occurs in children and adults. Severe complications are now much less frequently met with than in former years; possibly because the disease has assumed a milder type, but probably because the importance of keeping warm in bed is more generally appreciated. Convalescence should not be considered to be fully established until the temperature is normal; a subnormal temperature is common after subsidence of the fever.

Treatment.—Bed in a warm but well-ventilated room. The diet should consist of soda and milk, alternated with beef-tea or broths. Old people require stimulants, best given in the form of brandy, egg, and milk mixture. Thirst may be freely gratified. During the profuse perspirations a flannel night-dress, frequently changed, should be worn.

Medicines.—Bicarbonate of soda and carbonate of ammonia for old people. In mild cases a simple diaphoretic is sufficient, but for the acute headache and pains in the limbs, salicin or salicylate of soda with bromide of potassium may be given; the pulse must be watched, and if deafness or drowsiness occur the salicylate must be stopped. The bowels should be relieved by a saline aperient, diarrhoea treated with Dover's powder and bismuth. Eucalyptus oil, inhaled or distributed by means of a steam kettle, relieves the cough; ordinary cough mixtures appear to exert no influence. The cough often persists long after the other symptoms, but usually departs a few days after the patient goes away for change of air. A tonic of iron and nuxvomica is useful during convalescence.

Dengue.—A disease which closely resembles influenza, but is only met with in tropical or subtropical climates. The occurrence of a rash at the commencement of the illness, and again on the subsidence of the fever, is common, but not invariable, and the joints usually become swollen and tender. The fever lasts three or four days and then falls, but usually again rises after a few days; more than one relapse may occur. Bleeding from the nose, lungs, and bowels may take place. It is said never to be fatal.

Treatment as for influenza.

Diphtheria is an infectious disease, starting as a local inflammation of the throat or nose. The inflamed surfaces often become coated by exudation, which forms tough flakes called 'membrane.' The neighbouring lymphatic glands become enlarged. Fever is usually present. There is marked prostration of strength.

Period of incubation.—Usually two days; rarely longer than four, possibly seven.

Infection.—Usually conveyed by close contact, by the clothing of the sick, and by polluted milk. The poison is particularly active in damp sunless weather. Cats suffer from and can transmit the disease to man. Cows suffer from a form of the disease, marked by an eruption on the teats, and secrete poisoned milk.

The *onset* is usually marked by sore throat, often slight at first, but gradually increasing. Difficulty in swallowing may be noticed first. There is headache and a sense of weariness and ill-being. In bad cases there may be severe headache and vomiting. The temperature is often only slightly raised, but may rapidly reach 103° or 104° ; on the other hand, it may be normal or subnormal throughout. The tongue is often large and tremulous, and though not thickly coated in the majority of cases, is covered with a yellowish grey fur. The glands behind the angles of the jaw can be felt to be enlarged. If the throat is examined early, it will probably be found to be reddened and swollen only, but in a few hours white spots may have formed on the tonsils, or flakes on the uvula may be noticed. In typical cases these spots and flakes rapidly run together and form the membrane, which may simply cover the tonsils or extend on to the uvula and soft palate, forming a continuous sheet, light grey or dirty yellow in colour. In many cases the original spots only form quite small patches of membrane; in some cases no spots even can be detected.

When the disease begins in the nose the onset is most insidious. There is stuffiness of the nose, and often a thick or watery discharge, which irritates the upper lip. When occurring in a child the disease is often mistaken for a slight cold, but the glands at the angle of the jaw are enlarged, and the general weakness should be noticed. The nose may become affected subsequently to the throat; this is a grave condition. In many

cases the symptoms increase, and the pain and difficulty in swallowing become intense. The membrane may extend and involve the larynx. Hoarse voice, croupy cough, and extreme difficulty in breathing are symptoms of this having taken place. It may extend still further into the trachea and bronchial tubes, causing symptoms of bronchitis or pneumonia. In some cases the disease starts in the larynx, and is often mistaken for simple croup.

Diphtheria may easily be mistaken ; in fact it is impossible to diagnose, without the cultivation and investigation of the poison by skilled observers, when the exudation is scanty. The safest plan is to treat all cases of sore throat attended by enlargement of the glands as diphtheria, and to strictly isolate the patient immediately. A certain number of suspected cases prove to be scarlet fever, measles, or simple tonsillitis. The appearance of the rash and other characteristic symptoms distinguish the first two, the rapid recovery without symptoms of exhaustion the last named disease.

Complications.—1. Affections of the larynx and lungs. 2. Profound exhaustion with heart failure. 3. Inflammation of the kidneys, albuminuria or suppression of urine. 4. Paralysis, sometimes attended by fatal results, occurs in a large number of cases. The onset is insidious, and must be carefully watched for, particularly in children. It may occur during the course of the disease, or during the three following months. The soft palate is most often affected, and this is shown by alteration of the voice, which becomes nasal, or by choking during swallowing, and the food returning through the nose. Dimness of sight or squinting may show that the eye muscles are affected. Loss of power in the arms, staggering when walking, and wasting of the muscles, will attract attention when the limbs suffer. If death does not occur from heart failure, recovery is usually complete after a time. 5. Anæmia, more or less marked, is almost a constant accompaniment.

Treatment.—1. Preventive. Provided that actually inhaling the patient's breath is avoided, and the drinking-vessels, spoons, &c., used for his food are disinfected, the disease is rarely contracted by the attendants. It is well known that a mother nursing her child who is suffering from diphtheria usually contracts the disease, but a professional nurse rarely does so.

This is probably due to kissing, which should be particularly avoided.

2. Local treatment is most important. Attempts to remove the membrane, by frequently swabbing out the throat with pledgets of wool dipped in chlorine gargle or diluted Condy, should be practised in adults, but children will not submit to this without violent struggling, which adds to the exhaustion. The same solutions are better tolerated as a spray. Stronger disinfectants may be used under medical supervision. Boracic solution is safe, and better than nothing, but much less active than chlorine or Condy, though not so unpleasant. When the nose is affected it must be syringed at all costs.

3. Serum treatment. The injection of anti-diphtheritic serum has now been in use sufficiently long to prove that it is an invaluable remedy, involving infinitesimal risk—certainly no more than the application of strong poisonous disinfectants to the throat. The writer can bear grateful testimony to its efficacy from personal experience in his own family. The treatment must be conducted by a physician, but no time should be lost, or expense spared, in giving the patient the benefit of this treatment if it can possibly be procured. When failure occurs, it is due either to its being used too late, or to insufficient doses being administered through over-caution.

4. Medicines. No specific is known. The patient's strength must be supported and the anæmia treated. Perchloride of iron may be given to adults, and the ammoniated citrate with sal volatile to children. Emetics are sometimes used when difficulty in breathing occurs, in hopes of expelling the membrane blocking the air-passages, but rarely with success. During convalescence a tonic containing citrate of iron and quinine with *nux vomica* is useful.

5. General treatment. Rest in bed should be enforced, both during the disease and for a considerable period after the symptoms have subsided, according to the severity of the attack. The difficulty in swallowing necessitates the selection of food which contains the greatest amount of nourishment in small bulk. Eggs beaten up in milk with the addition of wine or brandy, is the most suitable form. Sucking ice relieves the thirst and diminishes the pain in the throat. The food given by the mouth may be supplemented by nutrient enemata.

Making the child cry or struggle should be avoided as much as possible, but the physician may find it necessary to feed the child forcibly by means of a stomach-tube passed through the nose.

A steam-kettle containing oil of eucalyptus makes the breathing more easy and diminishes the risk of lung complications. If difficulty of breathing sets in, no time should be wasted in giving emetics, but the medical attendant should be immediately summoned, who may save the patient's life by opening the windpipe (tracheotomy).

During convalescence over-exertion must be guarded against. If signs of paralysis are observed the patient should be at once put to bed again and kept at absolute rest and free from excitement until they have disappeared. Massage may be used if the limbs are affected.

Period of isolation.—One month after the disappearance of all membrane is the time usually given. It is now known that the poison may exist in the throat and nose for a much longer period than this, though probably not in a very active form. A child who has had diphtheria should certainly not be allowed to kiss other children for at least two months after convalescence is fully established.

Mumps.—A highly infectious disease, characterised by inflammation of the large salivary glands situated in front of and below the ear (parotid glands). Infection is probably conveyed by close contact, and is given off from the commencement of the illness and during the three following weeks.

Incubation.—Usually three weeks; as short as fourteen or as long as twenty-five days.

Onset.—There may be slight premonitory fever, rarely above 101° , or pain just below the ear may be the first symptom noticed. One side of the face is usually affected first, the other follows in a day or two. The sides of the cheeks and neck become greatly swollen and the outline of the jaw is lost. There is great pain on opening the mouth and in swallowing. The temperature may rise to 102° or 103° , and there is sometimes severe headache and delirium. The fever commonly lasts five or six days, and the whole illness about a fortnight.

Complications.—In males, inflammation of the testicles often

occurs; the affected gland may waste. In females, the breasts may be affected, and they may suffer from pain in the abdomen. Deafness of one ear occasionally follows.

Treatment.—Bed for the first five or six days. Fluid diet. The bowels should be kept freely open with salines. The face may be painted with belladonna and glycerine, and hot fomentations applied to relieve the pain.

Period of isolation.—Three weeks from the onset.

Whooping-cough.—*Characteristics.*—After a week or ten days' ordinary cold and cough, the 'whoop' is first heard at the end of a paroxysm of coughing. The paroxysms awake the child at night and are frequently followed by vomiting.

Infection by close contact; given off by the breath from the onset.

Period of incubation.—Probably fourteen days.

Onset is insidious; an ordinary catarrh of the head and chest with slight fever and frequent cough, presenting no characteristic symptoms, lasting for a week or ten days. The cough becomes more troublesome, particularly at night, and then takes the form of a series of short violent coughs, followed by a 'whoop' as the air is drawn into the lungs. These attacks may occur only three or four times in the twenty-four hours, or recur every half-hour. They cause great exhaustion; the child becomes blue in the face, and vomiting commonly follows them. There is usually drowsiness between the attacks, but the child starts up in alarm, and often screams, when he feels them coming on. Owing to the exertion and vomiting there is gradual loss of flesh, sometimes amounting to extreme emaciation. A sore may form under the tongue by being chafed when protruded, in coughing, against the lower teeth. The disease usually lasts from six to eight weeks. In mild cases there may be an absence of the 'whoop' throughout the illness.

Complications.—1. Bleeding from the nose and extravasations of blood in the whites of the eyes are common, due to the congestion of the face during the paroxysms. 2. Convulsions. 3. Bronchitis and pneumonia are common. 4. Ruptures may form, due to the straining.

Treatment.—The gravity of this disease is too little recognised by parents. Children are often allowed out of doors

whilst suffering from it, spreading the disease broadcast, and exposing themselves to the risk of lung complications. Very young children who are not attacked should be immediately removed to a house where there are no other children: it is extremely fatal to infants. The patient should be confined to bed if there is fever, and then to a warm room at a temperature of 65°. Fresh warm air is very important, and when possible, two rooms should be arranged on the same floor and used alternately; the windows of the unoccupied room should be thrown widely open, and left so until about an hour before the patient enters it; when it has become warm the patient should be brought in, and the other room thoroughly aired in the same way. Allowing children to wander about the passages or staircases of a draughty house is even more dangerous than letting them go out of doors. The food should be of the kind most easily digested, such as broths and diluted milk. When vomiting is a marked symptom, the food should be peptonised and given in small quantities immediately after the child has been sick. Under these circumstances the rule laid down as to regular feeding, so important in health, and most diseases, must be relaxed. The vomiting of whooping-cough is usually unattended by nausea, and if the food is given immediately after a paroxysm a certain amount is absorbed before the next occurs.

Medicines.—During the catarrhal stage expectorants consisting of ipecacuanha wine and liquor ammon. acet. should be given, with warm drinks of barley-water, and lemonade at night. When the paroxysms begin, bromide of potassium may be given, but no drug exerts much influence unless given in doses which are unsafe without medical supervision. It is far more effectual to keep the air of the room strongly impregnated with the odour of carbolic. This may be done by heating the powder over a night-light in a vaporiser, or by means of a steam-kettle containing carbolic solution (1 in 20). The fumes of sulphur have a similar soothing effect, and may be produced by putting some live cinders in an iron shovel, sprinkling some powdered sulphur on them, and then carrying the shovel about the room. Rubbing the child's chest with liniment night and morning so as to produce slight reddening of the skin is useful; the mixed tincture of iodine and turpentine liniment may be employed. During

convalescence care must be taken not to overfeed an emaciated child, or most troublesome catarrh of the intestine may be induced. Regularity in feeding is now most important, and cod-liver oil invaluable, except in very hot weather.

Period of isolation.—The patient must be considered infectious, and not allowed to mix with other children until all cough has disappeared. This may be several months.

CHAPTER III

DISEASES USUALLY CONTRACTED ABROAD

Cholera—Malaria or Ague—Malta or Mediterranean Fever—Yellow Fever—
Plague—Beri-beri.

Cholera (Asiatic).—*Period of incubation* is of doubtful length, but is probably never more than ten days.

Infection is given off by the patient's vomit and motions, and is probably only contracted by being swallowed. It is conveyed by contaminated water used for drinking or washing, and uncooked fruits and vegetables. Clothes and bedding soiled by excretions retain the poison for long periods. Persons suffering from disorders of the stomach and bowels are particularly prone to infection.

Symptoms.—There is often headache and depression, abdominal discomfort and diarrhœa for a day or two before the characteristic symptoms appear. These may be divided into two stages:—

1. Collapse: profuse diarrhœa with cramp of the abdomen sets in, usually accompanied by vomiting after a few hours. The motions are first coloured, but gradually become lighter until they are almost clear like rice-water. The contents of the stomach are first ejected, but subsequently the vomit consists of clear fluid. The patient suffers as though he were being bled to death. Within a few hours he becomes cold and pulseless, with pinched face and ashy lips. He has difficulty in breathing, talks in a feeble, husky voice, is bathed in cold sweats, and suffers acutely from thirst and cramps in the legs and feet. The temperature falls very low, and no urine is secreted. He may pass into a condition of coma and die. This stage may last from three to forty-eight hours.

2. Reaction may then occur: the pulse becomes perceptible, the breathing easier, and the colour returns to the face. The vomiting and diarrhœa become less frequent, the

abdominal pain ceases, and urine is again secreted. The temperature becomes normal or may be slightly raised, and convalescence sets in. In some cases violent diarrhœa recurs, the patient again becomes collapsed, and dies.

Treatment.—1. Preventive. During epidemics of cholera all water used for drinking or for washing utensils used for food should be boiled. Uncooked fruits and vegetables should be avoided. The patient's evacuations and soiled linen must be treated as in enteric fever, and the nurse must take similar precautions in cleaning and disinfecting her hands. All writers agree in the importance of keeping persons exposed to infection as cheery as possible.

2. Medicines. The premonitory diarrhœa must never be neglected, and should be treated with opium and astringents—chlorodyne is a valuable remedy, and may be given with brandy. During collapse it is futile to give drugs by the mouth or bowel, as they are immediately ejected. The thirst may be alleviated by small pieces of ice, or small quantities of cold water, given frequently. Large quantities aggravate the vomiting. Hot applications should be used to relieve the abdominal pain, and the cramp in the limbs is made more bearable by friction. Mustard-leaves applied over the heart and on the calves of the legs are useful. The food in this stage should consist of milk diluted with soda-water, teaspoonfuls of meat-juice, barley-water, and stimulants in the form of brandy or champagne and soda, given in small quantities at frequent intervals. The main efforts should be directed towards maintaining the heat of the body by hot bottles or bricks, and warm but light bed-clothing. During reaction, care must be taken not to overload the stomach, and food should be administered on the same lines as for enteric fever.

Malarial fever, ague.—Malaria is widely spread in marshy countries with abundant vegetation. It is especially prevalent immediately after the wet season, and amongst those engaged in clearing the land of trees and excavating the ground. Two forms of malarial fever may be distinguished:—

1. Intermittent fever, or ague, is characterised by the recurrence at regular intervals of paroxysms of shivering, succeeded by heat and sweating, lasting about twelve hours. They may occur

twice in the 24 hours, once a day, or every third or fourth day. The temperature in the intervals between the paroxysms is normal or subnormal. The patient usually knows when the attacks are coming on, and has headache and a sense of depression. The cold stage is marked by a rigor and frequently by vomiting; during the hot stage the patient is intensely thirsty, with flushed face and bounding pulse; the sweating which follows is usually profuse. The disease lasts from ten days to a fortnight.

2. Continued, or remittent fever, is often of gradual onset, though it sometimes begins with a rigor. The temperature rises to 103° or 105° , and continues high. There may be irregular paroxysms of chilliness, followed by sweating, after which the temperature falls somewhat, but does not touch normal. The tongue becomes thickly coated; there may be vomiting and occasionally jaundice. The spleen may be felt to be enlarged. After lasting a week or ten days the fever may disappear, or there may be intermittent attacks.

Complications.—There is almost invariably some bronchitis present, and pneumonia may supervene. Severe vomiting and diarrhoea are common. In Africa the attacks are accompanied by the passing of blood-stained urine. As the result of severe, or repeated, attacks profound anæmia and general debility may occur, and the spleen and liver may become an enormous size.

Treatment.—The poison exists in stagnant water and the lower strata of air, and is particularly virulent at night. Therefore in malarial countries drinking-water should be boiled, and marshy ground avoided at night, if possible. The upper storey of a house should be selected for sleeping in, and when it is impossible to avoid camping out, a mackintosh should be laid on the ground and large fires should be kept up. Strong tea or coffee and a dose of quinine (4 grains) should be taken in the early morning, which may be repeated at night. When a person is attacked, quinine, gr. 5, should be given four times in the 24 hours for the first three days, and then reduced to doses of gr. 3 until the end of the week, or continued if the fever persists. Doses of gr. 10 may be necessary in severe cases. The bowels should be kept open with small doses of calomel, gr. 1 or 2, and saline aperients. During the cold stage, warm drinks, hot bottles, and blankets should be employed. During the

hot stage, perspiration should be encouraged, but the hot-water bottles should be removed and the clothing made lighter. During the sweating which follows, care must be taken against cold; substituting dry blankets for those which have become saturated is comforting to the patient. 'Warburg's fever tincture' is largely used in the tropics in the treatment of malaria.

The diet should be fluid, consisting principally of diluted milk. Stimulants are not required unless the pulse becomes feeble and the tongue dry and brown.

During convalescence, iron is needed, and people who have had repeated attacks, or who suffer from severe anæmia, should leave the country.

Malta or Mediterranean fever.—This disease is common in Malta, Gibraltar ("Rock fever"), Cyprus, and on the coasts of the Mediterranean Sea.

Infection is probably caused by breathing the emanations of soil polluted by sewage.

Period of incubation is of doubtful duration; probably about one week.

Symptoms and course.—The onset is insidious, and marked by loss of appetite, weakness, headache, and usually slight fever. Improvement may occur for a few days, followed by a relapse, marked by the onset of shivering, vomiting, and high fever. Intense pain in the back and limbs is common, and profuse sweats occur. The tongue becomes thickly coated, the bowels are usually constipated, but diarrhoea may be present. The liver and spleen commonly become enlarged and tender. There is usually some cough and bronchitis. The pulse becomes rapid and feeble, and the patient is markedly anæmic. The temperature is very irregular, often falling considerably at night and rapidly rising in the morning. Pain and swelling of the testicles are often met with. After an indefinite period, one to six weeks, the temperature may fall and convalescence set in. Relapses are, however, common, and the patient is liable to repeated attacks for many years.

Treatment.—A saline aperient should be given if there is constipation. Quinine, salicin, and salicylate of soda appear to exert no influence on this disease. Antipyrin certainly relieves

the pain and reduces the fever temporarily, but owing to the exhausting nature of the illness it must be used with caution. Gr. 10 may be given every three hours until the pain is relieved or sleep induced, but it must not be employed too continuously. Blisters may be applied to the joints, or they may be painted with belladonna and glycerine, and hot wool laid over them. Any movement usually causes great pain. The general treatment must be conducted on the ordinary lines laid down for fever.

Yellow fever.—This disease is met with in the towns on the sea coast of the West Indies, Brazil, and West Africa. The onset is marked by a rigor or chills, pains in the limbs, vomiting and constipation. The fever lasts from two to three days, and then falls. It may not return, and the patient then convalesces. In typical cases the temperature rises again, the vomiting returns, and the patient becomes jaundiced. The vomit may contain bile, or in severe cases blood, altered in colour by the gastric fluid. This constitutes the “black vomit.” Diarrhœa and bleeding from the bowels may occur.

Treatment.—Treat the fever at the onset with quinine, and relieve constipation with castor oil or calomel. Perchloride of iron may be given when bleeding occurs. The patient should be fed on diluted milk and beef-tea given frequently in small quantities, iced when possible. The evacuations and the clothes of the patient must be disinfected.

Plague, bubonic or Oriental plague.—A disease arising in towns or villages the soil of which is polluted by the filthy habits of the inhabitants. The onset is marked by headache, giddiness, mental confusion, often by vomiting. Fever is present from the first, or sets in after a few hours; it may last from two to five days. The characteristic symptom is painful enlargement of the lymphatic glands, most commonly of the groins or armpits, constituting the ‘buboes.’ Usually one gland is more enlarged than the rest. Suppuration of a buboe is considered a favourable sign, rapid subsidence during the disease unfavourable. If the patient survives the first five days he will probably recover.

Treatment.—No drug appears to exert any influence, but a

serum recently discovered, if injected early enough, appears to be efficacious. The patient should be removed from his own surroundings and treated by a free supply of fresh air and sponging. Attendants on the sick in well-ventilated hospitals rarely contract the disease. The patient's clothing should be destroyed and the dwelling disinfected.

Beri-beri.—A widely spread disease common in Japan and the Malay Peninsula, and frequently imported into other countries. Low-lying damp localities are particularly affected. Fever is not a constant symptom. The characteristics are profound depression, pain and tenderness of the limbs, with progressive wasting of the muscles. There is anæmia, and the face and limbs become swollen from dropsy. Breathlessness and palpitation of the heart cause great distress, and often foretell death.

Treatment.—Remove the patient when possible to a higher locality, and give saline aperients. Salicylate of soda and gentle friction help to relieve the pains. During convalescence iron and nux vomica should be given.

CHAPTER IV

CONSTITUTIONAL DISEASES

Rheumatism: Rheumatic Fever; Chronic Rheumatic Affections; Chronic Rheumatism; Rheumatoid Arthritis; Muscular Rheumatism—Gout: Acute, Chronic, Irregular—Anæmia: Chlorosis; Pernicious Anæmia—Rickets: Scurvy Rickets; Fœtal Rickets—Scurvy—Purpura—Hæmophilia: ‘Bleeders.’

RHEUMATISM

1. **Acute rheumatism** or **rheumatic fever** is most common in young adults, between the ages of ten and forty. The disease is common in certain families, and is usually attributed to cold or damp, getting wet through, or sleeping in a damp bed. An attack of tonsillitis, scarlet fever, or gonorrhœa is often followed by rheumatic fever, and women after childbirth seem especially liable.

Symptoms.—The onset is usually sudden, but the attack may be preceded by malaise or tonsillitis. There is high fever, followed by pain and swelling in one or more of the joints, and profuse sweating. The face is flushed, the tongue thickly coated with moist white fur; the urine is scanty, high-coloured, and thick, and the bowels are constipated. Usually, several joints are affected, causing such intense pain that the patient dare not move. The inflammation in one joint often subsides, and immediately another becomes affected. The temperature may rise to 105° or 106° and be accompanied by delirium. The fever begins to fall and convalescence sets in usually after ten days or a fortnight. In some cases the fever and other symptoms are less intense, but the condition persists for weeks or months. Rheumatic fever is particularly liable to be complicated by inflammatory affections of the heart and pericardium, pneumonia, and pleurisy. Skin eruptions are often met with, usually due to the profuse sweating.

Treatment.—Flannel night-dress. The sheets must be removed from the bed and a double layer of blankets placed under the patient. Both the night-dress and under-blanket must be frequently changed after the sweats. The diet should consist of milk diluted with soda or lime-water. Chicken or veal broth may be given if the milk is not taken well. Lemonade or barley-water without sugar may be given freely. Mustard-leaves placed above and below the inflamed joints relieve the pain. Belladonna-paint and wool are useful. Well-padded splints fixing the joints often give great relief. Medicines are given (1) to relieve pain and (2) to shorten the attack.

1. Salicylate of soda or salicin, grs. 15, may be given every three or four hours, according to the severity of the attack, for the first forty-eight hours. Deafness, ringing in the ears, stupor, and feeble pulse are signs that they should be discontinued. They may be given alone or with bicarbonate of potash, grs. 20. If the salicylates do not give relief, Dover's powder, grs. 5, may be given, the signs of opium poisoning being watched for. Salicylates and opium should not be given together, as profound stupor is sometimes produced. 2. Bicarbonate of potash should be given as long as the fever lasts. From ten to thirty grains is the usual dose. The urine should be tested with litmus paper, and when the urine ceases to be acid, shown by the paper retaining its blue colour, the dose should be diminished. High temperature should be treated by cold sponging or packing, delirium by an ice-bag to the head. Heart affections are best treated by leeching or blisters; their onset is often marked by the occurrence of delirium. Some physicians place mustard-leaves over the heart every third or fourth day to prevent these complications, and it is a good routine practice when skilled advice is unobtainable. Stimulants, such as sal volatile, brandy or whisky, are required if the pulse flags.

During convalescence, woollen clothing must be worn. The diet must be light; meat only taken once a day; and sugar and alcohol, particularly beer, are best avoided.

2. Chronic rheumatic affections with slight or no fever. There are many varieties of these conditions; some of them have probably but little connection with rheumatism, but are due to

changes in the nervous system. Owing to the difficulty which is often present in distinguishing these conditions, and the fact that they must be treated on the same lines, they are here dealt with together.

(1) *Chronic rheumatism* occurs most often in poor people of middle or advanced age who have led laborious lives, and been exposed to cold and damp. Sometimes only one joint, such as the knee or hip, is affected, more often there is disease of many joints. The prominent symptoms are stiffness and pain, most marked in the morning, after the joints have been at rest, and during changeable weather. The joints are somewhat swollen and the muscles of the part wasted from disuse. In many cases the general health is feeble, anæmia and dyspepsia being common.

(2) *Rheumatoid arthritis, rheumatic gout, or arthritis deformans* affects people of all classes, often commences in early adult life, and is more common in women than men. The disease may be limited to one joint; usually one or two are first affected, and many others involved subsequently. The striking features of the disease are that the cartilages of the joints become worn away and the ends of the bones become greatly enlarged. Stiffness and pain in the joints, creaking or even scrunching on movement, wasting of the muscles, and gradually increasing deformity and immobility, are prominent symptoms. The patient may appear to be in good general health, but anæmia, dyspepsia, mental irritability or depression are common.

Treatment.—A dry climate should be sought for. Woollen under-clothing. Treatment of the digestion is all-important; a nutritious diet with a free supply of fatty food, such as cream, butter, and milk. Alcohol should be taken in extreme moderation, and acid wines, sweet champagne, and beer avoided. Gentle exercise is good, but any exertion involving strain on the joints is harmful. The joints should only be kept at rest when movement causes great pain. Douching and massage of the joints and muscles should be persevered with. When only one of the large joints is affected, and the patient is able to get about, it should be lightly bandaged with flannel; this is beneficial, not only by the warmth, but by the presence of the bandage reminding the wearer not to strain the joint. When

the pain is severe, menthol liniment, belladonna liniment, laudanum fomentations, painting with iodine, and the occasional application of mustard-leaves are efficacious; one often succeeds when another has failed. If the patient has a sound circulation Turkish baths are useful, but the heart should in all cases be examined before these are resorted to. The saline or sulphur baths of Bath, Buxton, Harrogate, Droitwich, Woodhall Spa, or Strathpeffer are beneficial in many cases, but anæmic patients usually derive more benefit from a bracing climate or iron waters (Harrogate, Cheltenham, Brighton, Tunbridge Wells). Salicin may be given to relieve pain, but exerts no curative influence. Iron, cod-liver oil, and arsenic are the remedies which most often produce improvement.

3. Muscular rheumatism is closely connected with neuralgia, and often arises from the same causes. It frequently follows prolonged muscular exertion or a strain. The onset is often sudden like neuralgia, and the patient may say that he felt something snap. Dull aching or boring pain, stiffness of the part, or weakness and numbness are the prominent symptoms. The muscles of certain localities are especially liable to become affected:—

(1) The muscles of the neck. The head is twisted and held stiffly to one side. The condition is called *wry-neck* or *torticollis*.

(2) *Lumbago* affects the muscles of the loins. The patient is unable to turn in bed, or rise from a sitting position, in severe cases.

(3) *Sciatica* affects the muscles of the buttock and back of the thigh. The leg feels weak and heavy; there is often numbness of the foot. Stooping or going upstairs aggravates the pain.

(4) *Intercostal rheumatism* resembles, or is identical with, intercostal neuralgia. The patient is often afraid to draw a deep breath, laugh, or cough. He often thinks he has pleurisy, but fever is absent.

(5) Pain in the *heel* and *sole* of the foot; most often met with in sufferers from gout or gonorrhœa.

Treatment.—Rest the affected part. In severe cases of sciatica a long splint similar to that used for a fractured thigh

is sometimes needed. Even the vibrations of a carriage or railway train aggravate the suffering; a fact which many doctors are painfully aware of. The popular remedy, a porous plaster, probably acts by necessitating the part being held stiffly and causing some skin irritation. Heat and pressure give relief, such as ironing with a hot flat-iron, a piece of flannel being interposed between the iron and the skin. A hot bath and salicylate of soda, gr. 10, on going to bed, is useful treatment at the beginning of an attack. Massage is useful to get rid of the stiffness at the end of an attack, but may aggravate the condition if practised in the early stages of acute pain. See NEURALGIA for other methods of treatment.

GOUT

Gout is a morbid condition produced by the imperfect performance of the chemical processes which convert food into energy and heat, and produce waste products in a suitable form for excretion. The result is that substances allied to urea exist in too large a quantity in the blood and tissues, lowering their vitality, disturbing their functions, and rendering them liable to attacks of inflammation. Urates and uric acid are commonly present in the urine, and urate of soda is often deposited in the joints, forming the 'chalk-stones' of gout. Persons of all ranks are attacked: the city alderman leading a life of luxury and faring 'sumptuously every day'; ill-nourished people leading anxious lives and consuming the cheap forms of food; and the labourer, whose one idea of enjoyment is a liberal supply of beer. Gout is frequently inherited, and may exist in people whose mode of living is temperate and conducive to health in every way; but its onset is often prepared by:—

1. Food taken in greater quantities than the system requires.

2. Improper food: an excessive amount of meat; alcoholic excess; pastry, buttered cakes and the like, which contain starch, fat, and sugar cooked together.

3. Chronic indigestion.

4. Indolence; too little food being expended in the form of muscular energy.

5. Imperfect excretion, due to constipation or kidney disease.

Neglect of cleanliness, and too much work being thrown on the kidneys through defective cutaneous excretion.

6. Chronic lead poisoning.

An attack of gout may follow some mental emotion, such as anger or worry, exposure to cold or wet, or occur during the period of reaction from the shock caused by injury.

Three forms of gout are commonly recognised :—

1. **Acute gout** occurs in attacks which may be repeated three or four times in the year, and are common in the spring and autumn. The patient may have premonitory symptoms, such as mental irritability, dyspepsia, or twinges of pain in the feet and hands. The attack usually comes on in the early morning. The patient is awakened by intense pain in the joint of the big toe. Swelling rapidly occurs, and the skin becomes red and shiny. There is marked tenderness, even a light touch causing agonising pain. Fever is usually present; at emperature of 101° or 102° is common. Suppuration is extremely rare. The pain diminishes during the day, but returns at night, gradually diminishing in intensity day by day. An acute attack usually lasts about a week. In some cases the joint symptoms suddenly disappear, and severe constitutional disturbance occurs, such as delirium, difficulty in breathing, or vomiting and diarrhœa. This is termed 'suppressed' gout.

2. **Chronic gout** commonly succeeds repeated acute attacks, particularly if these warnings are unheeded, and no attention is paid to the general health. In these cases a large number of joints become affected; those of the feet and knuckles of the hands are attacked first, and the large joints follow. They become swollen and deformed from the deposit of urate of soda in the tissues, both within and around the joint, and the skin may ulcerate and the 'chalk-stones' protrude. The upper margins of the ears are often thickened and irregular from this deposit. The patient may look strong and vigorous, but he is often feeble and anæmic, with symptoms of the kidneys being affected. See GOUTY KIDNEY.

3. **Irregular gout** is often met with in members of gouty families who have never suffered from an acute attack. Their

urine is frequently high-coloured and thick, from the deposit of lithates, and uric acid crystals may be detected. 'This condition is sometimes termed 'lithæmia,' or 'uric acid diathesis.' Almost every organ of the body is liable to disturbance. The following are the more common manifestations:—

(1) Nervous symptoms: headache, neuralgia, pain and cramps in the muscles.

(2) Disorders of the circulation: palpitation and weak action of the heart; thickening of the coats of the arteries; and inflammation of the veins.

(3) Respiratory disorders: asthma, chronic bronchitis.

(4) Digestive disturbance. Symptoms of 'congested liver,' and diarrhœa.

(5) Diseases of the kidneys and bladder: renal colic, stone, and cystitis.

(6) Skin eruptions, such as eczema.

(7) Affections of the eyes: iritis and glaucoma.

See INDIGESTION IN CHILDREN.

Treatment.—Persons liable to gout should avoid damp dwellings, wear woollen clothing, keep the pores of the skin free by baths, and friction with a rough towel, and take regular exercise, when possible, in the open air. 'They should live temperately, abstain from alcohol, and eat moderately' (Osler).

The diet should consist mainly of animal food, with the exception of the coarse sorts of meat. Appended is a table showing the relative suitability of various articles of diet.

1. May be taken	2. Taken sparingly	3. Avoided
Milk	All forms of starchy food	Sugar, jams
Eggs	Bread	Pastry, buttered cakes
Fish, oysters	Potatoes	Beef, veal, pork
Chicken, game	Cornflour, rice, &c.	Salt meat
Mutton and lamb	Coffee	Pickles and vinegar
Fats	Good whisky	Strawberries
Toast	Dry light wines	Stewed fruits
Fresh vegetables		Champagne, beer
Oranges, lemons		Stout, cider.
Tea, cocoa		
Mineral waters, potash preferable to soda.		

Water should be freely taken in the early morning and on going to bed; it relieves constipation, and facilitates excretion

by the skin and kidneys. The medicinal treatment of gout must largely depend on the general condition of the patient. In all cases the bowels should be regulated; a saline aperient such as the artificial Carlsbad salts, taken in the early morning, is a good routine practice in full-blooded patients, and a small dose of 'blue pill' may be taken once a fortnight. Many drugs are given aiming at diminishing the acidity of the urine and increasing the excretion of uric acid. Citrate of potash, $\mathfrak{z}\text{l}$, or lithia, gr. 5–10, may be given in a tumbler of water on rising. A comparatively new preparation named piperazine, given in the same way, acts most efficiently in many cases of irregular gout. Anæmic patients are often benefited by iron and cod-liver oil. Chronic gout may require a course of baths and treatment at Bath or Harrogate, but the improvement which may result must not be taken as an indication that general hygienic precautions may be relaxed.

An attack of acute gout should be treated by the administration of a brisk aperient such as blue pill, gr. 5, followed by a saline; or compound jalap powder, $\mathfrak{z}\text{l}$. Robust patients may take colchicum wine, $\mathfrak{m}\text{l}\mathfrak{v}$, with bicarbonate or citrate of potash, gr. 15, three times a day. Water should be freely drunk, and the diet consist of milk and potash water. Small quantities of stimulants and chicken or veal-tea may be required. The limb should be elevated on pillows, the part painted with belladonna and glycerine, wrapped in cotton wool, and the bedclothes kept off with a cradle. Douching the foot with hot soda and water, or steaming it, by wrapping it in dry wool and covering it with oiled silk, often gives relief. Patients in whom colchicum causes much depression can often take salicylate of soda, gr. 10, three times a day. If this disagrees, or fails to relieve the pain, Dover's powder, gr. 5, may be given, in the absence of kidney disease.

ANÆMIA OR BLOODLESSNESS

The term anæmia is commonly used to include a variety of conditions attended by diminution in the number of the red blood-corpuscles, increase in the number of the white corpuscles, or deficiency in the red colouring matter. The latter is the more common. Anæmia may be the result of loss of blood, chronic wasting illnesses, acute fevers, mal-nutrition, or poisoning by such

substances as lead or mercury. In these conditions it is called *secondary* anæmia. There are two forms of anæmia, which arise often without any obvious cause, and so may be called *primary*, requiring special mention.

1. **Anæmia or chlorosis** is an extremely common affection in young girls and women. It may be due to bad food, and want of fresh air and sunlight. It, however, often occurs in a previously healthy girl, who goes from a poverty-stricken cottage into service in a large house in the neighbourhood, where she is infinitely better housed, clothed, and fed. Mental emotions and prolonged exertion produce anæmia. Possibly home-sickness and constantly mounting stairs in large houses combine to produce the condition in servants. Breathlessness on exertion, indigestion, constipation, and irregularity in the monthly periods, are the common symptoms. The patient rarely loses flesh, more often she becomes fatter than usual; in severe cases the complexion has a peculiar yellow-green tinge, and the lips are almost colourless. In moderate cases the cheeks and lips may be red, but the skin of the rest of the face looks white and transparent, and the mucous membranes of the gums and eyelids are much paler than in health. Palpitation of the heart and shortness of breath cause much distress. The appetite is capricious, and food is often followed by discomfort or acute pain, relieved by vomiting. (See CHRONIC GASTRITIS.) In severe cases blood may be vomited, and other symptoms of ulcer of the stomach be present. There is usually a strong inclination for prolonged periods of sleep; the patient is difficult to rouse in the mornings, and awakes dull and unrefreshed. She is frequently scolded for this symptom of her disease.

Treatment.—Regular hours for meals, rest, and gentle outdoor exercise, the regulation of the bowels, and the administration of iron, sum up the treatment. An anæmic girl should spend at least nine hours in bed, and be spared as much stair work as possible. She should be given a cup of milk diluted with hot water on rising, and her food should be easily digestible, given at regular intervals. Salt food, beef, pork, and tea are best avoided; milk, eggs and fish should be taken freely. In cases attended with severe indigestion meat should be withheld altogether. (See CHRONIC GASTRITIS.) The most suitable forms of

aperients are either the salines, or aloes given in combination with iron. When indigestion is a marked symptom, bismuth and bicarbonate of soda should be given before food, and some easily digested form of iron, such as reduced iron, taken afterwards. Few preparations are better than the well-known Blaud's pills, which contain sulphate of iron and carbonate of potash. When the digestion is fairly good a mixture containing tincture of nux vomica, $\text{m}\bar{5}$, citrate of iron and quinine, gr. 5, citrate of potash, gr. 20, water 1 oz., may be given three times a day, fifteen minutes before food. This is particularly useful if breathlessness is a marked symptom. Many physicians prefer the tincture of perchloride of iron, with sulphate of magnesia and glycerine to prevent constipation. This is apt to irritate the stomach in some patients.

The treatment should be continued for some months after improvement has taken place, or the symptoms will certainly recur.

2. Progressive or pernicious anæmia is a somewhat rare affection, occurring most often in middle-aged men. The onset is usually insidious, and the possible cause forgotten. It is occasionally attributed to anxiety or some bodily strain. The symptoms are gradually increasing weakness and profound anæmia, which resist the administration of iron and nourishing food. Some patients are benefited by arsenic.

The treatment of the secondary forms of anæmia must be conducted on the ordinary lines of convalescence. Tonics, nourishing diets, rest and fresh air.

RICKETS

Rickets is a disease of childhood, due to mal-nutrition, the result of improper food or chronic gastro-intestinal disturbance.

The symptoms vary according to the age of the child: vomiting and diarrhoea, with occasional attacks of bronchitis, and the late appearance of the teeth, are most prominent in infants, deformity of the bones and muscular weakness in older children. The causes of rickets are:—

(1) The infant being nursed too long, especially if the mother is enfeebled by bearing many children.

(2) Bottle-feeding and the food not agreeing.

(3) The food being deficient in fat, and consisting mainly of starchy substances, such as cornflour or patent foods, prepared without milk.

(4) Irregularity in feeding, and the child constantly nibbling biscuits or cakes between meals.

(5) Faulty hygienic surroundings and improper clothing, causing waste of animal heat and disturbance of the digestion by chill.

The onset is always insidious. Infants who are becoming rickety are often heavy and fat, and except for occasional colds and attacks of vomiting and diarrhoea, nothing definite is noticed until the sixth or seventh month of age, the period of teething. Intestinal disturbance, with the passage of offensive clay-coloured motions, is now almost constantly present, attacks of bronchitis are common, and convulsions may occur. The child is feverish, restless and fretful; its body is tender, and it cries when being dressed or dandled; it sweats profusely, particularly about the head, and the bedclothes are kicked off at night. These symptoms are usually put down to teething, but the teeth fail to appear, and often none are cut until the twelfth or fifteenth month. The vomiting and diarrhoea may cause wasting, and the bones of the forearms, at the wrists, and the lower ends of the thigh-bones, at the knees, are then noticed to be enlarged. Nodules of enlarged bone can almost constantly be detected on the front of the chest, at the junction of each rib with its cartilage. The chest is narrow and undeveloped, and the abdomen distended. In many cases wasting is absent, and the condition of the bones is not noticed, but the child becomes more helpless. In severe cases no attempt is made to crawl or walk, and the condition may be mistaken for paralysis. More often, though the attempts are made late, the art of crawling and walking is acquired, and the soft bones are bent by the weight they have to support. The arms suffer most in crawling children, the legs when they are able to walk.

A child aged two years, suffering from rickets of moderate severity, often presents the following picture:—The head is large and broad, the hair dry and scanty, the face is white and puffy, the nose flattened, the teeth few in number; the chest is contracted, the breast-bone protruding, and the abdomen dis-

tended; the wrists and the ankles are thick, the legs either knock-kneed or bandy; the bowels are irregular, the motions offensive, and the urine scanty and high-coloured.

‘**Scurvy rickets**’ is a condition met with in the neglected infants of the destitute poor, and is marked by great emaciation, bleeding from the gums, extravasations of blood under the skin, and deformities in the limbs. (See SCURVY.)

Infants are sometimes born with deformities resembling rickets. This condition is called ‘**fœtal rickets**.’ These children are cretins.

Treatment.—Children who are fed at regular times (see HYGIENE OF CHILDHOOD) with a good supply of fresh milk rarely develop rickets, though it may be produced by chronic indigestion, the result of some acute disease, such as whooping-cough or measles. When symptoms of the disease present themselves, the digestion must be treated and the diet regulated. In many cases no medicine is required at all, but the following treatment may be necessary:—Stop all starchy food, and give good milk, diluted with lime-water, at regular hours. Remove irritating matter from the intestine by giving castor oil, half a teaspoonful, or grey powder, gr. 1, divided into three doses. Then give two or three grains of rhubarb and soda powder, three times a day, for one week. If the vomiting is severe, it may be necessary to withhold milk altogether for two or three days, and give meat-juices, or the whey and cream mixture. Bathe the child night and morning, and rub the limbs briskly with a soft towel; remember that the bones are tender at first. Keep the bedroom windows open, and let the child be out of doors as much as possible in fine weather. When the bowels are regular, cod-liver oil may be given twice a day during the winter, and a few drops of steel wine are useful. The treatment of the digestion, however, is all-important, and tonics should not be given which cause constipation. It may be necessary to repeat the castor oil or continue the rhubarb and soda powders. If the legs are bandy, the child must be kept off its feet, and the limbs douched with salt and water, and diligently rubbed, night and morning. If the child is neglected, the deformities may require correction by operation and iron supports, but these are rarely necessary if the most ordinary care is shown. It is often difficult to keep a

child off its feet, but a narrow wooden splint, fastened to the outside of each leg and projecting for three inches beyond the foot, makes walking impossible, and the child soon becomes reconciled to a sedentary existence. Children of two or three years of age who can take solid food should be given dripping, butter, and cream. Small quantities of meat may be minced and given occasionally, eggs are useful, and fish is usually well taken. The juice of oranges or lemons and stewed fruit should be given, but raw apples, salted meat, pickles, and pastry must be avoided. Rickety children are usually fond of potatoes, but these and all forms of starchy food must be given very sparingly. The treatment of 'scurvy rickets' is the same; raw-meat juice is particularly valuable in these cases, and small quantities of orange and lemon juice are required. 'Fœtal rickets' is an entirely distinct disease, and requires the administration of preparations of thyroid gland under medical direction.

SCURVY, SCORBUTUS

Scurvy is a disease produced by a diet deficient in fresh meat and vegetables. It was formerly common amongst sailors; but canned vegetables and lime-juice have now made scurvy almost unknown amongst ships' crews. It is now more often met with in besieged towns.

Symptoms.—Weakness and anæmia. Foul breath, swollen and bleeding gums. Extensive bruises form as the result of slight injuries or without any apparent cause. Convulsions and delirium may occur.

Scurvy may occur in *children*, most often in connection with rickets, but sometimes exists alone in the children of the rich, who have been reared wholly on artificial foods sterilised by prolonged boiling. The symptoms are swelling of the gums, marked tenderness, loss of power, and swelling of the limbs, especially of the legs. (See RICKETS.)

Treatment.—The juice of lemons, raw-meat juice, and un-boiled milk. The mouth should be cleansed by a wash of alum, boracic acid, or chlorate of potash. In time of war or other emergencies, when vegetables are unobtainable and scurvy threatens, meat should be eaten raw.

PURPURA

Hæmorrhages under the skin and from the mucous membranes may occur in infectious diseases of a malignant type, in conditions of great debility, and occasionally in healthy persons from no discoverable cause. The treatment consists in supporting the patient's strength by iron tonics and nourishing food. Arsenic is sometimes beneficial.

HÆMOPHILIA, HÆMORRHAGIC DIATHESIS,
'BLEEDERS'

This is an inherited condition marked by a tendency to uncontrollable bleeding from trivial wounds, or extravasations of blood in the tissues, often without injury. The condition is popularly described as having 'a skin too few,' or 'only one skin.' No changes in the blood or tissues have ever been discovered to account for it. Several members of one family are often sufferers; the females are rarely affected, but their male children commonly inherit the disease.

Symptoms.—The patient, if an adult, may know that he belongs to a family of 'bleeders,' but often the first indication occurs in childhood, a trivial cut or even a scratch continuing to ooze for days, until extreme exhaustion occurs from loss of blood. Bleeding from the nose, or from the mouth as the result of a tooth being pulled out, is very common, and has often proved fatal. Extravasations of blood may occur in the joints, or form large doughy swellings beneath the skin.

Treatment.—No 'bleeder' should submit himself to an operation, however trivial; in his case decayed teeth should be stopped, never extracted. He should avoid all rough games when a boy, and choose an occupation free from bodily risk in adult life. When bleeding occurs, absolute rest must be enforced, the part elevated, and gentle pressure and cold applied. A tooth-socket may be plugged. The dressing of a wound should be disturbed as seldom as possible. Iron should be given when the bleeding has ceased.

CHAPTER V

VENEREAL DISEASE

‘Soft sores’—Syphilis—Gonorrhœa.

‘**Soft sores, soft chancres,**’ are ulcers occurring on the genital organs without constitutional symptoms, unless the poison of syphilis is inoculated at the same time.

Symptoms.—Twenty-four hours after infection there is itching followed by the appearance of several papules, which becomes pustules about the third day. These burst two days later, and leave small ulcers, which often extend into one another. The ulceration may be very extensive, and a considerable area of tissue become destroyed. It is particularly likely to occur if the foreskin is tight and cannot be retracted, so as to cleanse the surface. Inflammation of the lymphatic glands of the groin (bubo), and the formation of abscess, are common. If properly treated, the ulcers usually heal in from four to six weeks, leaving depressed scars; but it often happens that when the ulcers are almost healed the tissues around become thickened and hard, and the constitutional symptoms of syphilis show themselves.

Treatment.—Absolute cleanliness is all important. The foreskin must be retracted and the inflamed surface bathed with ‘black-wash,’ and then dusted with iodoform. This must be repeated every three hours. The ulcerated surface must be kept from coming in contact with healthy tissues by interposing a piece of lint soaked in black-wash. If the foreskin cannot be retracted, black-wash must be frequently syringed underneath, to wash out the discharge. If the tissues become greatly inflamed or the ulceration is extensive, the patient should remain in a warm sitz-bath for many hours together. If the glands in the groin enlarge, the patient must remain altogether in bed, or only leave it in order to take a bath, and an attempt made to avoid suppuration by constant cleanliness and hot

fomentations. If an abscess forms, the sooner it is lanced, the better. The constitutional treatment consists in keeping the bowels relaxed with saline aperients, and if the patient is debilitated, tonics and sea air may be required. The onset of syphilis must be watched for.

Syphilis is a disease characterised by a prolonged latent period after infection; the formation of a sore at the seat of inoculation, followed by constitutional symptoms and fever; these tend to disappear at the end of twelve months, but may be followed by chronic inflammation of the tissues and ulcerations, which may persist for many years.

The symptoms are usually grouped together for the purpose of description, and are called primary, secondary, and tertiary, but they often merge into one another.

Infection.—The poison may be inoculated and the primary sore form on any part of the body; the genitals, fingers, knuckles, and lips are common situations. Surgeons are frequently infected by handling syphilitic sores and the poison obtaining admission through a crack or scratch on the fingers; striking a diseased man on the mouth and cutting the knuckles against his teeth is occasionally the method of inoculation.

Period of incubation.—If the syphilitic poison alone enters a wound, from three to five weeks elapse before the sore is noticed; the period may be shorter if some other poison, such as that of soft sores, is inoculated as well.

Primary syphilis.—The sore or chancre is usually single, but the number depends on the number of points of inoculation. It may take a variety of forms, but usually a small red papule is first noticed, with thickening of the surrounding tissues, gradually increasing in size and forming a hard gristly button by the end of a week. This is known as a ‘hard chancre.’ There is often no discharge or ulceration, and it may not be recognised as a sore. In other cases the skin is simply thickened over a varying area and altogether escapes observation.

When situated on the finger or lip, the sore is usually very large, and may cause great deformity from thickening of the surrounding tissues. A hard chancre may ulcerate and gradually destroy the surrounding tissues to a great depth; it is then termed a phagedænic or sloughing chancre. It most often occurs in people of debilitated health and when cleanliness is neglected.

Soon after the appearance of the chancre the neighbouring lymphatic glands begin to enlarge and become swollen and hard, like pistol-bullets, beneath the skin. Like the chancre, they are painless and often escape observation; they rarely become acutely inflamed or suppurate.

Secondary syphilis.—About the sixth or eighth week after being infected (two weeks after the appearance of the sore) the constitutional symptoms set in. There is usually malaise, slight headache, chilliness, and some aching in the limbs. This is due to fever, which is rarely high and usually only amounts to a temperature of 99° or 100°. The following symptoms may then be noticed:—(1) Soreness of the throat due to congestion of the tonsils and soft palate, which look red and inflamed, with grey or silvery streaks of mucus, or patches of ulceration. (2) Skin eruptions, which are usually most profuse on the front of the chest and abdomen, the front of the arms, and the back of the legs. These eruptions may resemble any form of skin disease, and often two or more varieties are present simultaneously. The most common form is a blotchy pink eruption, somewhat resembling measles, but papules and scaly spots are also frequently present. (3) Soreness of the mouth and tongue, and the formation of soft warty elevations. (4) Falling off of the hair, and the nails becoming brittle and cracked.

Somewhat later the bones may ache and become tender, and there may be attacks of synovitis, most frequently of the knee-joints. Inflammation of the eyes (iritis) may also occur.

The above are the more common symptoms which occur during the first year, and if treated no further trouble may arise. If treatment is neglected, or the patient falls into a condition of chronic ill-health, he may suffer from skin affections which are often scaly or attended with the formation of crusts, or from disease of the testicles, of the arteries, or of the nervous system.

Tertiary syphilis is characterised by the formation of inflammatory nodules (gummata) in the tissues, which slowly soften and ulcerate. Unless treated the ulceration continues indefinitely. No tissue is exempt from the formation of a gumma, but the skin, the tongue, the bones, and the testicles are most often affected.

Treatment.—Immediately syphilis declares itself the patient

must take mercury regularly and continuously. Grey powder is the best form, as it causes least irritation of the intestine. Five grains of grey powder should be mixed with five grains of Dover's powder; this should be divided into four powders, and taken at regular intervals in the twenty-four hours. This should be continued for at least six months. Whilst taking mercury the patient must abstain from anything likely to irritate the mouth or intestines—smoking, curried or spiced food, green vegetables, fruit, spirits, coffee, and aperients. If diarrhoea occurs, or the gums become swollen, and the flow of saliva profuse, the mercury must be diminished or temporarily discontinued, and a chlorate of potash mouth-wash used. The chancre is best treated by bathing with black-wash or dusting with iodoform. If it ulcerates, hot sitz-baths must be taken for many hours together, and the general health must be attended to. Sore throat must be treated by gargles of chlorate of potash, and ulcers touched with nitrate of silver. Whilst any symptoms of secondary syphilis are present, the patient must guard against infecting other persons; the poison can only be conveyed by direct inoculation, but kissing, drinking with others from the same vessel, and smoking another man's pipe, must be avoided. However well he may seem, he must consider himself infectious for one year, and must not marry for at least two years after contracting the disease. If the patient becomes weak and ill, nourishing food and change of air are probably required, and tonics of iron and *nux vomica* may be taken; but it is useless to abandon mercury and trust to vegetable 'blood purifiers' in the early stages of the disease.

The tertiary symptoms usually rapidly disappear if iodide of potassium is taken. It is impossible to lay down the dose, as some individuals are peculiarly intolerant. From fifteen to thirty grains daily, divided into three doses, is the usual amount. It must be taken after food, dissolved in half a tumbler of water, and *sal volatile*, half a teaspoonful, may be added with advantage. When iodide of potassium disagrees, it causes running from the eyes and nose, like a severe cold in the head, a skin eruption like acne, and great depression of spirits. The local treatment of the ulcers presents nothing peculiar; iodoform ointment is a useful application, but if iodide of potassium is given regularly and the general health supported

by tonics, cod-liver oil, and good food, they heal whatever treatment is adopted. Like other ulcers they must be kept clean, and the diseased tissues have rest. It is not necessary to continue iodide of potassium after the ulcer has healed, but it must be resumed if other symptoms appear or the scars show signs of breaking down again. A person infected with syphilis must take every precaution against lowering his vitality by exposure to cold and wet, or alcoholic excess. The disease occurs in its most virulent form in intemperate people.

Gonorrhœa, clap, is an acute inflammation of the urethra in men, of the genital passages in women. The disease so closely resembles many other affections in women that it is here only described as it occurs in men.

Symptoms.—On the third or fourth day after infection there is itching or smarting on passing water, the orifice of the urethra becomes slightly swollen, and a slight discharge may be noticed. These symptoms rapidly become more marked, the pain on passing water amounts to intense burning or scalding, the discharge is profuse, and the fluid opaque, yellow, or greenish. The foreskin becomes swollen and is difficult to retract, the glands in the groins are enlarged and tender. There is usually some pain in the back and testicles, and sleep is disturbed by frequent and painful erections. These symptoms begin to subside after lasting from two to three weeks, the pain on passing water becomes less severe, the discharge, though profuse, becomes less turbid and more like unboiled white of egg, and then diminishes. In favourable cases the attack lasts from six to eight weeks. The complications which may occur are—(1) Suppuration of the glands in the groin; (2) acute inflammation of the testicles; (3) inflammation of the bladder; (4) purulent ophthalmia by inoculation of the poison; (5) rheumatic affections of the joints, eye (iritis), tendons, ligaments, and other fibrous structures; lumbago, sciatica, and neuralgia in many forms. (6) Stricture of the urethra very frequently results.

Treatment.—Absolute rest in bed is desirable. All muscular exertion must as far as possible be avoided; the diet should consist of milk, eggs, fish, milk-puddings, and large quantities of barley, soda, or plain water should be taken; all forms of wine, beer, spirits, and coffee must be absolutely withheld.

Weak tea may be taken in small quantities. During the stage of acute inflammation the bowels must be kept freely relaxed, and the urine rendered less acid by alkaline mixtures, such as sulphate of magnesia and citrate of potash, gr. 30 of each, taken three times a day. A seidlitz-powder, or some other brisk aperient, may be given at the commencement. Any attempt to cut the attack short by the use of injections at this stage is extremely dangerous. The parts must be kept clean by frequent bathing with tepid water or boracic lotion, and the discharge must be received by a pad of absorbent wool placed in a linen bag suspended from the hips by tapes. This wool must be changed frequently, and burnt after removal. The hands must be washed immediately after changing the wool, lest the eyes become accidentally inoculated. If a patient cannot remain in bed, the testicles must be supported by a suspensory bandage. When the pain on passing water diminishes, sandal-wood oil, $\text{m}10$, or copaiba, $\text{m}15$, in capsules, may be given three times a day after food. This will probably cause the discharge to diminish and become clear, and injections may then be used with caution. Sulphate of zinc, gr. 4 in water 1 oz., mixed with an equal quantity of hot water, may be used twice a day, but not more than one tablespoonful of the fluid should be injected at a time. The patient must first pass water, fill the syringe (a half-ounce glass syringe), and then lie on his back and inject the fluid. When the discharge is scanty, the sandal-wood or copaiba must be discontinued, and iron tonics, such as citrate of iron and quinine with citrate of potash, are usually required. Painful erections may be treated by a full dose of bromide of potassium, gr. 15, taken at night, and light, cool bed-clothing; when they occur, the application of some cold object, such as an empty bottle held between the legs, gives relief. If a testicle becomes inflamed, the pubic hair must be cut short, and a mustard-leaf or leeches be applied on the shaved surface, just above the fold of the groin on the same side. The testicle must be supported on a small pillow placed between the legs, and evaporating lotion applied. The occurrence of rheumatism is a grave complication; it is usually very acute at the commencement, relapses are common, and frequently the joints become permanently impaired. It must be treated on the lines laid down for acute rheumatism, but the discharge from the

urethra must be treated by injections. The other complications are treated elsewhere. It frequently happens, after all acute symptoms have subsided, that a discharge of purulent or turbid fluid persists for some months. It may cease for a few days, but returns directly the restricted diet is relaxed. This is usually due to an ulcerated surface in the urethra, and unless skilled treatment is sought, a stricture will probably result.

PART VII

LOCAL DISEASES

CHAPTER I

DISEASES OF THE NERVOUS SYSTEM

Headache—Giddiness—Neuralgia—Sleeplessness or Insomnia—Convulsions or Fits—Apoplexy, Apoplectic Fit—Epilepsy—Hysteria—Nervous Exhaustion—St. Vitus's Dance, Chorea—Inflammation of the Brain—Tuberculous Meningitis—Water on the Brain, Hydrocephalus—Infantile Paralysis.

NERVOUS conditions which require prompt treatment, and some of the more common affections which are influenced by simple remedies, are described in the following pages. It would serve no useful purpose to attempt to describe the many complex forms of chronic palsy or paralysis. Skilled examination is required for their diagnosis, and their successful treatment at the present time has not been arrived at in very many cases. Infantile paralysis is mentioned, because so much can be done by the persistent efforts of parents, and treatment is too often abandoned as hopeless.

Headache is a disorder arising from many causes, and is a common symptom in many diseases. It is usually associated with other symptoms indicative of its origin, which must be recognised in order to treat it correctly. The following varieties are commonly met with, and are arranged according to the conditions which may produce headache, a practical classification devised by Dr. Latham :—

1. Due to disease of the structure of the brain or its membranes: acute inflammation, abscess, tumours, tuberculosis, or injury. The pain is usually constant, and other symptoms, such as vomiting, paralysis, or fever, are almost invariably present.

2. Congestion of the brain, due to increased force in the circulation, from fever, full-bloodedness, excitement, heart and kidney disease attended with thickening of the arteries, chronic excess in eating and drinking, and constipation. The pain is

usually a dull ache over the whole head, and there are throbbing and giddiness on stooping. The face is congested, the eyes red, the pupils contracted, and the pulse is rapid and hard.

3. Congestion with feeble circulation, due to debility or anæmia, or the exhaustion following fatigue, excitement, or drunkenness. The face is usually pale, the pupils dilated, and the pulse rapid and full, but soft.

4. Nervous or 'tic headache': 'migraine.' Often hereditary. Gout, rheumatism, or anæmia. Mental emotions, fatigue, or indigestion. Polypus of the nose or throat, defective vision and eye-strain. Decayed teeth. Pain often intense, usually on one side of the head, starting in the eye or temple and radiating upwards, or downwards into the neck. Nausea and vomiting are common. Noise, or light, aggravates the symptoms. The attacks often recur at regular intervals.

5. Due to impurities in the blood, in fever and kidney disease, or from chronic constipation, tainted food, bad wine or spirits, impure air.

6. Affections of the scalp and bones of the cranium may give rise to headache. Rheumatism, neuralgia, inflammatory conditions, a tight hat, or head-lice.

Treatment.—This must necessarily depend on the cause. This should always be ascertained if possible before resorting to the popular remedies. When symptoms of active congestion (Class 2) are present, rest, cold to the head, fluid diet, a brisk aperient, and mustard-leaves to the back of the neck, are usually needed.

Iron tonics should be given in anæmia. Exhaustion should be treated by rest and strong black coffee. A saline aperient, followed by a teaspoonful of sal volatile in a tumbler of soda-water, may be given after alcoholic excess. In migraine, the constitutional conditions must be treated, and excitement and all forms of excess avoided. If the patient knows that an attack is impending, calomel, gr. 1, may be taken, followed by a saline aperient. During the attack, rest in a dark room and abstinence from food. Black coffee may be taken. Phenacetin, gr. 5, repeated if necessary at intervals of one hour until gr. 15 have been taken; sleep is usually induced by the first or second dose. No relief is experienced unless the patient lies down whilst under the influence of phenacetin. Ammonium or potassium bromide,

though less efficacious, should be used by persons with feeble circulations. For the treatment of headache occurring in other conditions the special headings must be referred to.

Giddiness, swimming in the head, vertigo, may be due to disturbance of the circulation of the brain, commonly precedes fainting, or be caused by any of the conditions which give rise to shock or fainting. It is a common symptom in anæmia, and in persons subject to epileptic fits and disorders of the eye, ear, and digestion. It is also present, and often accompanied by blindness, in certain grave conditions of the brain. From these remarks it will be gathered that giddiness is a symptom, and the treatment depends on the disease giving rise to it.

Neuralgia is a term applied to attacks of pain occurring in the course of nerves, due to some constitutional condition, or to irritation or inflammation of the nerves themselves. Muscular rheumatism is probably due to the sensory nerves of the muscles being affected. Neuralgia is closely associated with rheumatism, and often accompanies anæmia, typhoid fever, and malaria. Exposure to cold and decayed teeth are common causes. Pressure or irritation of the nerves caused by tumours, diseases of bones and joints, or concretions in the biliary and urinary passages, may give rise to neuralgia. It is a common source of complaint in hysteria.

Symptoms.—The pain is usually localised to a portion of the body supplied by a certain group of nerves, comes on more or less suddenly, and is commonly described as being stabbing or burning. The skin over the affected area is often tender or hot, and there may be twitching of the muscles. The attack often subsides suddenly, some numbness of the part usually following. The pain may be so severe as to cause symptoms of shock. The attacks often recur at regular intervals.

The following are common forms of neuralgia:—

Facial neuralgia or *tic douloureux*.—The eye and temple are most often affected. The eye may become swollen and tears pour down the cheek. The most common cause is decay of the teeth (see DISEASES OF THE TEETH); it may also be caused by diseases of the eyeball, glaucoma, and iritis.

Intercostal neuralgia.—Pain between the ribs and over the

pit of the stomach is often accompanied by an eruption known as 'shingles,' or 'herpes.' It consists of small red, raised spots in irregular groups, scattered along the course of the nerves, which rapidly develop into minute blisters. They dry up after a few days and drop off, leaving minute scars which often persist. Pain is usually present for two or three days before they appear, but they cause intense itching and burning, and their disappearance is often followed by attacks of severe neuralgic pain, which may persist for weeks or months. 'Shingles' may occur anywhere about the body; the forehead, cheeks, neck and shoulders, are common situations. They are very frequently present about the lips and nose in pneumonia.

Neuralgia of the heel and sole of the foot is common in gouty people, certain forms of rheumatism, and in flat foot.

Neuralgia of the stomach and intestines is described with the diseases of those organs.

Neuralgia of the sacrum and coccyx is common in women, and is often rebellious to treatment. It is due in many cases to affections of the generative organs, or to piles or fissure of the anus.

Lumbago and *sciatica* are conditions closely connected with neuralgia, but as the symptoms are mainly those of affections of the muscles, they are dealt with under the head of 'Muscular Rheumatism.'

Treatment.—The constitutional condition must be treated, anæmia by iron, ague by quinine, rheumatism by salicylate of soda and diet. Local sources of irritation, such as decayed teeth, must be sought for and treated. Large doses of quinine, or a combination of iron and arsenic, are often successful in cases in which no cause can be discovered. The affected parts should be kept at rest as much as possible: shading the eyes from the light in facial neuralgia, and a flannel roller wound firmly round the chest in intercostal neuralgia, often give relief. Local applications of heat, painting with belladonna and wrapping in cotton wool, or rubbing the affected parts with menthol or belladonna liniment should be practised. Blistering with mustard plasters makes the pain more tolerable in severe cases; the plaster should be placed near the point where the affected nerve emerges from the skull or spine, in front of the ear in facial neuralgia, and by the side of the spine in intercostal

neuralgia. 'Shingles' may be made more tolerable by painting the spots with collodion, or smearing the affected area with belladonna and glycerine and wrapping it in cotton-wool. For the persistent attacks of pain which sometimes follow, minute doses of calomel, gr. $\frac{1}{6}$, four times a day after food, are often invaluable.

Sleeplessness, insomnia.—Sleeplessness may be a symptom of irritation of the brain in febrile conditions, or may be caused by local pain or uneasiness, indigestion, or mental emotions. Many intractable cases are met with in apparently healthy people from no discoverable cause. Reference is here made more particularly to those conditions of sleeplessness which arise without any obvious bodily ailment, and which often yield to simple treatment. The more common causes are:—

(1) Emotions, such as grief, worry, or excitement, which have been undergone during the day. (2) Prolonged mental exertion and neglect of muscular exercise. (3) Brain-work, persevered in after fatigue is felt, or some engrossing study continued up to the moment of retiring to rest. (4) Going to bed hungry or cold.

It is occasionally caused by severe or unaccustomed bodily exercise, most often in hot weather, and the condition is described as being 'too tired to sleep.' Excitement probably plays a prominent part in the production of this condition, and there is cerebral congestion present.

Treatment.—Drugs should not be resorted to without first considering and correcting any errors in the general sleeping arrangements. (See *HYGIENE, Rest.*) We here repeat that warm, easily digested food is the most valuable of all sleeping draughts. Arduous mental work should always be abandoned for half an hour before going to bed and some relaxation indulged in, such as a short walk, dumb-bell exercise, or a not too exciting novel. A sedentary life and much brain-work should be mitigated by periods of active exercise. The condition of over-fatigue is best treated by a tepid bath or sponging, and a long draught of water before getting into bed. A teaspoonful of salt in a pint of hot water may be taken. When sleeplessness is due to worry, an attempt should be made to divert the thoughts by one of the following popular methods.

Taking deep breaths and breathing out gently and slowly through the nostrils, fixing the attention on the outflowing stream of air. Counting an imaginary flock of sheep. Repeating some verse of a nursery rhyme over and over again. Watching, in imagination, a sailing ship. Drugs should not be taken except under medical advice. Opium and its preparations may be necessary to relieve pain, but should never be taken to allay mental emotions. If the habit of sleep has been broken by enforced irregularity in going to bed, a dose of bromide of potassium or phenacetin may be taken on two successive nights to re-establish the habit of regular sleep, but it must be discontinued on the third night. All sedatives, if too long continued, gradually lose their effect and produce nervous irritability or depression. Children's 'soothing-syrups' are condemned elsewhere. A harmless sleeping-draught has yet to be discovered.

Convulsions or fits.—These terms are applied to various conditions of the nervous system which are accompanied by violent involuntary movements of the muscles. The contractions of the muscles may persist for several seconds, producing continuous rigidity, or there may be rapidly alternating relaxations and contractions, producing jerking, irregular movements, known as 'spasms.' They are usually accompanied by unconsciousness. Convulsions occur at all ages, but in adults they are usually only symptoms of other diseases.

In children they occur frequently, and may be due to—

1. Irritation from teething, indigestion, or worms.
2. Fevers, such as scarlet fever, measles, or pneumonia, usually at the onset, the fit taking the place of a rigor.
3. Malnutrition from diarrhoea or rickets.
4. Diseases of the brain and nervous system; injury during birth.
5. Emotions, such as fright.

Symptoms.—The attack may come on without warning, or there may be peevishness or restlessness for some days before. One limb is usually first affected and begins to twitch, then the body becomes stiff, the eyes are turned up, and the breath is held. The face then becomes livid, jerking movements of the limbs follow, the head is thrown back, and the face is contorted.

After a period usually varying from a few seconds to two minutes, the movements become less violent, and the child drops asleep or passes into a state of coma. The attacks may follow one another with great rapidity or may last some hours.

Treatment.—During the fit, loosen the clothes and sprinkle cold water on the face and head. If it can be prepared in time, a warm bath, temperature 98°, or warm packs, and cold to the head. For general treatment, see RICKETS and SPASM OF THE LARYNX.

In young or middle-aged adults fits may be due to head injuries, epilepsy, hysteria, kidney disease, or poisons.

In persons past middle life fits usually take the form of apoplexy.

On page 340 is appended a table showing the common forms of convulsive seizures, their symptoms and treatment. This is for the purpose of ready reference in cases of emergency. The conditions are more fully dealt with under their respective headings elsewhere.

Apoplexy, apoplectic fit, and paralytic stroke.—

Apoplexy is loss of consciousness coming on more or less suddenly without obvious failure of the heart's action. It may be due to—

1. Poisons in the blood due to kidney disease or diabetes; alcohol, opium, or belladonna poisoning.

2. Head injuries, sunstroke. (See COMPRESSION OF BRAIN.)

3. It may follow an epileptic fit or other form of convulsions.

4. Rupture, or plugging, of the blood vessels in the brain, caused by degeneration of the walls of the vessels, or heart disease. This is most common in people past middle age, particularly in those suffering from kidney disease.

The symptoms of onset vary according to the cause. When due to bleeding in the brain, there is sometimes giddiness and headache preceding the attack, and twitching of the face or limbs, usually on one side of the body. Convulsions are common in kidney disease, and may appear suddenly. In drunkenness and poisoning (except from strychnine) the onset is usually slow, and the convulsions are absent. When the symptoms are

Age.	Convulsions	Epileptic fit	Hysterical fit		Apoplectic fit
			Women. aged.	Young or middle-aged.	
Common cause ;	All ages. Particularly children.	Commences in childhood. Continues in many cases during adult life.	Strong emotions, anger or grief.	Young or middle-aged.	Persons of middle or advanced age, unless due to head injury.
Onset.	Fevers, teething, rickets, intestinal disturbance; disease of brain, kidneys; poisons.	Inherited, head injury. Often none discoverable.			Degeneration of arteries, heart and kidney disease, strain or injury.
	Often sudden.	Sudden. Often at night, when patient is alone.			Often sudden; giddiness and headache may precede.
Symptoms.	Somewhat resemble epilepsy, but are irregular. No cry.	One loud cry. Complete loss of consciousness. Rigidity at first. Falls and hurts himself. Breath held. Silent. Face pale or blue. Jerkings spasms. Bites the tongue, often severely. Urine passed unconsciously. Lasts a few minutes.	Cry absent, or continuous. Rarely unconscious. Rigidity either absent, or continuous. May fall, but does not hurt herself. Continues to breathe; often screams. Face flushed. Struggling. Bites herself and other people, rarely severely. Urine contained. Rarely less than fifteen minutes, often several hours.		Twitching or jerking of the face or limbs, usually of one side. Complete unconsciousness. Sinks to the ground. Breathing slow and noisy. Face usually congested. Usually motionless. Pulse full, strong, and slow. Urine passed or retained. May last several days.
After-symptoms.	Complete recovery or stupor. Often recur at short intervals.	Stupor or profound sleep, with flushed face.	Flood of tears. Sulkiness.		Fever. Paralysis common.
Immediate treatment.	Cold sponging to face and head. Hot bath, temperature 98°. Hot packs.	Loosen clothes round neck. Protect the head. Prevent the tongue being bitten by placing cork between teeth.	Talk as little as possible. Avoid expressions of sympathy. Douche with cold water. Loosen dress and stays. Open windows widely.		Raise head and shoulders. Loosen clothes. Cold to the head. Hot-water bottles to the feet. Calomel. Avoid giving stimulants.

fully developed there is deep unconsciousness; the face congested, usually flushed, but sometimes grey looking; the breathing slow, but noisy and blowing; the pulse full, strong, and slow. The limbs are usually motionless. There is usually fever within forty-eight hours after the onset. In some cases there is loss of power in the limbs before loss of consciousness occurs. When due to head injury or bleeding in the brain, on recovering his senses the patient commonly finds that he has lost power in the limbs, usually on one side of the body. The right side of the face, right arm and leg are often paralysed, and though the patient may be quite conscious he is unable to speak.

Treatment of an apoplectic fit.—Loosen the clothes and raise the patient's head and shoulders on pillows. Tie a handkerchief tightly round one of the thighs, but do not twist it; the object is only to stop the venous circulation, not to compress the arteries in the limb; the blood collects in the leg and being temporarily withheld from the rest of the body, this procedure is a modified form of bleeding. Apply ice, or cold in some form to the head, hot bottles to the feet. Mustard-leaves may be applied to the nape of the neck, the calves, and soles of the feet. Place calomel, grs. 5, as a powder on the back of the tongue, and then give milk in teaspoonfuls, the head being turned on one side, to wash it down. Brandy and all forms of stimulant should be avoided.

After-treatment.—A physician must be sent for as soon as possible. Fluid diet, regulating the bowels, and absolute rest must be persevered with for some weeks.

Epilepsy almost invariably commences in early life, is often inherited, but may be excited by fright, infectious fevers, and chronic irritation of the nose, throat, intestinal canal, or genital organs. Epilepsy occurring for the first time in adult life may be due to head injury, or to some grave mental or constitutional disease.

The disease is characterised by attacks of unconsciousness, usually attended with convulsions. No attempt is made to describe epilepsy without convulsions, as that form of the disease is but little understood, and is a constant source of dispute between the legal and medical professions.

Symptoms.—The patient often knows when a fit is coming on owing to some peculiar sensation, affection of smell, or twitching in a particular group of muscles. In many cases there are no warning symptoms, the patient utters a loud cry, becomes insensible and rigid, and falls as if shot. He remains rigid with all the muscles straining to the utmost, and becomes blue from the breath being held. After a few seconds the limbs begin to twitch, and there are violent convulsions of all the muscles of the body. The tongue is often caught between the teeth and severely bitten. He froths at the mouth, and the urine and fæces may be voided. After one or two minutes the convulsions become less violent and he sinks into a condition of coma, with a red and congested face, noisy breathing, relaxation of the limbs, and profound unconsciousness. He remains in this condition for a variable period, and then awakes suffering from headache and mental confusion. The attacks may recur at short intervals.

Treatment.—*During the fit*, place the patient on his back, supporting the head on a cushion or folded coat, loosen the clothes, especially about the throat, and place a cork or pencil between the teeth to prevent the tongue being bitten. Care should be taken that he does not strike his head on hard ground or flooring during the convulsions. When sleep comes on, wait patiently, and do not attempt to arouse him. He should be kept under observation for some hours after the fit, as epileptics, though apparently completely restored to consciousness, sometimes perpetrate strange acts. *In the intervals* the patient should lead a quiet life and take light diet, especially at the last meal. Meat should only be taken once a day. Any source of irritation must be carefully sought for and treated. An epileptic whose occupation takes him away from home should wear a label with his name and address on it fastened inside his coat, so that if found unconscious in the street he may be conveyed home. Bromide of potassium is often successful in keeping off or modifying the severity of the fits. It must be given in fairly large doses, gr. 10 three times a day after food for an adult, and this amount may have to be largely increased.

The disease is incurable in those cases where no source of irritation can be found.

Hysteria is a disorder of the nervous system disturbing the mental and bodily functions without disease of the tissues. Men and boys are sometimes affected, but it is far more common in women. It occurs in members of families subject to nervous disorders of various kinds. Luxury, indolence, an unhealthy indoor life, and affections of the generative organs predispose to hysteria, and it may be excited by religious emotions, grief, anger, fright, and anxiety. The manifestations of hysteria take an infinite number of forms, and often simulate actual organic disease so closely that the most expert physicians may be baffled. In hysterical affections, pain and morbid sensations are described with much detail by the patient; but tangible signs of disease, such as elevation of temperature, are almost invariably absent, and deformities, fixation of joints, and paralysis disappear when consciousness is abolished by the administration of chloroform. The occurrence of hysterical excitement, or 'fits,' often make the nature of the condition obvious, but these are frequently absent.

Disease is often feigned for the purpose of escaping unpleasant duties, and minor discomforts exaggerated to excite sympathy; but mere shamming and silliness do not constitute hysteria. In many cases hysteria is quite independent of the will, and its manifestations may interrupt useful work, causing both mental and pecuniary distress to the sufferer. The more common symptoms are pain and tenderness, most often situated in the head, spine, or joints; choking or difficulty in breathing due to a sensation of a ball rising in the throat; flushing of the face, palpitation of the heart, flatulence, and abdominal pain. All these symptoms are present without fever, signs of inflammation, tumour, or other signs of organic disease. The spirits of hysterical patients are liable to great variations, gaiety and depression alternating without obvious cause. They are often extremely pleasant to strangers, but objectionable at home; a German physician has described them as 'street angels, house devils.'

A hysterical 'fit' is usually excited by some emotion such as anger or grief; men rarely suffer from them. The patient begins to sob or laugh, or does both alternately. She is then seized with convulsions, falling on to a bed or sofa, rarely on to the ground, kicking or struggling. She becomes flushed and

hot from the exertion, but does not become blue. She may strike or bite herself or bystanders. She never hurts herself very much, and is usually noisy, screaming or talking incoherently. She may appear to be unconscious, but usually remembers an unfeeling or rude remark made by a bystander. The attack may last some hours, and commonly ends in a flood of tears. She may be exhausted by her exertions, and wish to remain quiet after the attack, but there is no complete loss of memory.

A severe form of hysteria occasionally occurs in which the attacks closely resemble epilepsy; to this the term *hystero-epilepsy* is often applied.

Treatment.—Hysterical patients should be carefully observed without their being aware of it. The condition is aggravated by sympathy and solicitude, and a fond mother is often an obstacle to recovery. Severe cases may require complete isolation from their relations and intimate friends. Treatment must be directed towards improving the general health and distracting the patient's attention from her own sensations to some other source of interest. Nerve sedatives, such as bromide of potassium and the ammoniated tincture of valerian, are useful in hysteria attended with fits of excitement; but these drugs must not be continued too long, and the majority of cases are best treated by iron, quinine, nux vomica, fresh air, and exercise.

Treatment of a hysterical fit.—There is no cause for alarm, and the bystanders should keep cool and show no concern. The patient will not hurt herself. Dashing cold water over the face usually succeeds, especially if the patient is wearing a dress likely to be spoilt by the process. The clothes should be loosened, the stay-laces cut, and the windows widely opened to admit plenty of cool fresh air.

A man should, if possible, avoid attending a hysterical woman unless a third person is present. Unfounded charges are often brought against medical men and others by women in this condition.

Nervous exhaustion may be caused by overwork and worry, or follow an accident attended with fright or shock, or an illness such as influenza. These cases often occur in men, and the symptoms are irregular and may resemble hysteria.

The condition is sometimes called 'male hysteria,' but fits of excitement do not occur. Headache, sleeplessness, depression of spirits, indigestion, and weakness in the limbs are common symptoms.

Treatment.—The condition should be guarded against in hard-worked men by regular periods of relaxation, and after accidents and illnesses by a proper period of rest. Medicines are of little use; nux vomica is a good tonic. Sleeping-draughts must be avoided and stimulants taken in great moderation. Change of air and scene is usually required. A sea-voyage is preferable to railway travelling. Prolonged rest in bed is sometimes necessary.

'St. Vitus's dance,' chorea, is a nervous affection characterised by irregular spasms of the muscles. It is most common amongst girls, though boys are sometimes attacked, between the ages of six and fifteen years; it also occurs in pregnant women. It often follows rheumatic and scarlet fever. It is commonly attributed to fright, grief, overwork at school, or to seeing another child suffering from the disease. Heart disease in one form or another is present in a very large number of cases, and the condition is often closely allied to hysteria.

Symptoms.—The child is usually restless, and often scolded for being 'fidgety' at the commencement of the illness. 'Making faces' or inability to dress herself may also be noticed. Dropping and upsetting things at meal time become constant, and these signs, together with irritability of temper and alteration in the speech, show that something is seriously wrong.

When fully developed the movements are constant and only cease during sleep. The muscles of the face twitch, and the mouth alternately grins widely or is pursed up. The tongue is protruded and withdrawn with a jerk. The hands and arms perform peculiar twisting movements, and the child writhes in bed. There is great weakness of the muscles of the limbs. Recovery usually takes place after a period of from one to three months. Relapses are common.

Treatment.—When the first symptoms are noticed, the child must be kept free from excitement and separated from other children. Rest in bed should be enforced from the first. The diet should be nourishing, but of the simplest kind. The bowels

must be regulated, and the presence of thread-worms watched for. In severe cases the bed-rails must be carefully padded to prevent the child injuring herself, and in all cases precautions must be taken against falling out of bed. Sponging with warm water will sometimes still the movements if the child is unable to get to sleep. The condition requires skilled treatment, owing to the condition of the heart and other complications which may be present. Arsenic given in large doses is often followed by rapid improvement. Nerve sedatives, such as bromide of potassium, have but little effect.

Inflammation of the brain and its membranes may be due to injury to the head, diseases of the ear, or accompany acute fevers such as typhoid. The symptoms and treatment are described elsewhere. (See INJURIES TO THE HEAD and DISEASES OF THE EAR.) Tuberculosis sometimes originates in the brain, or gives rise to symptoms without evidence of the disease being present elsewhere, the condition being called—

Tuberculous meningitis.—This disease is most common in children. The onset is insidious. It may follow measles or whooping-cough, or a previously healthy child may begin to look ill and lose weight without obvious reason, and become fretful and irritable. There may be occasional attacks of vomiting or diarrhoea, the tongue being clean, and no cause found to account for digestive disturbance. Restlessness at night and starting up with a scream are common. There is usually slight fever at night. The child becomes intolerant of the light, complains of headache, and is dull and apathetic. The pulse is often slow and irregular. There may be improvement for a few days and then return of the symptoms. After some days or weeks, marked by gradually increasing dulness and bodily weakness, convulsions may occur, and irregular contractions of the muscles, or squinting be noticed. A common symptom is contraction of the muscles at the back of the neck, so that the head is bent stiffly backwards. The approaching end is marked by convulsions and long periods of complete insensibility.

Treatment.—Wasting in a child should always receive careful notice. A child may look thinner, but does not actually lose weight unless there is something seriously amiss. The diet

should be carefully regulated, any book-work stopped, and more time allowed out of doors without undue fatigue. If severe headache occurs, the child should be kept in a cool and darkened room, mustard-leaves applied to the back of the neck, and a purge of grey powder, gr. 2-3, given, followed by a saline on the following morning. Bromide of potassium may then be given. The disease is an extremely grave one, and skilled advice should be obtained as soon as possible.

‘Water on the brain,’ or chronic hydrocephalus, usually begins during the first few weeks or months of life. This condition is due to distension of the cavities of the brain with fluid; the bones of the head become thinned, and the intervals between them enlarge. The vault of the head becomes an enormous size compared with the face. Convulsions, rigidity of the limbs, and idiocy often accompany the condition.

Treatment.—When suspected, small doses of grey powder should be given regularly under medical supervision.

‘Infantile paralysis’ is a disease usually occurring in early childhood, marked by a feverish attack, accompanied by loss of power in the limbs, and followed by wasting of the muscles. It is commonly attributed to some disease of childhood, such as teething, diarrhoea, or measles, but there is often no cause which can be definitely determined. The stage of fever is usually brief, lasting only a few days, and it is not until this has passed off, and the weakness in the limbs continues, or the muscles are noticed to be wasting, that the nature of the disease is recognised. In the majority of cases the muscles, or certain groups of muscles, of one limb only are permanently affected. As the child grows, the affected limb is usually smaller and feels colder than its fellow, the joints are loose and flail-like, and deformities occur, due to muscles, which have escaped, contracting without the normal opposition of other muscles.

Treatment.—The feverish stage must be treated on ordinary lines; even if the nature of the disease is suspected the subsequent wasting cannot be prevented. Skilled advice is necessary to prevent the development of deformities, and light iron supports must be worn during the period of growth.

Great improvement in the wasted muscles follows if massage and galvanism are persevered with. The mother should be instructed by a physician as to how to apply these remedies. Noticeable improvement is not a question of days, but of months and years. Few conditions require or repay devoted care so much as infantile paralysis.

CHAPTER II

DISEASES OF THE CIRCULATORY SYSTEM

Heart—Arteries : Angina Pectoris—Veins : Phlebitis ; White Leg ; Varicose Veins—Lymphatics : Adenitis ; Tuberculous Glands.

DISEASES OF THE HEART AND BLOOD-VESSELS

DISEASE causing *alteration in the structure of the heart* is almost invariably the result of some general constitutional disturbance, and rarely originates in the heart itself. The common causes are rheumatism, pneumonia, scarlet and typhoid fever, chorea, gout, and kidney disease. The conditions which may result are : (1) Inflammation of the pericardium ; (2) alteration in the structure of the valves and the valvular orifices, causing obstruction to the flow of the blood, or allowing it to leak back instead of barring its return ; (3) thickening of the walls of the heart, and subsequent dilatation of its cavities.

These conditions produce symptoms which are more or less common to all, and a correct diagnosis depends upon skilled examination, which can only be acquired by prolonged practice. Suitable treatment can only be arrived at by weighing the constitutional and physical signs present in each case. To attempt to enumerate and differentiate the special symptoms of the various conditions in a work of this description would be futile. The only possible result would be to confuse the reader, or to produce an erroneous idea as to the treatment, which requires so many modifications under special circumstances.

Disturbance of the heart's action without alteration in its structure, shown by palpitation of the heart or irregular pulse, may be produced by

- | | | |
|------------------------------|---|--|
| 1. Mental emotions | { | Grief.
Worry.
Excitement.
Hysteria. |
|------------------------------|---|--|

2. Indigestion, or the excessive use of
- | | | |
|--|---|----------|
| | { | Tobacco. |
| | | Tea. |
| | | Coffee. |
| | } | Alcohol. |

3. Prolonged muscular exertion, especially if attended by excitement; common in growing boys and young men.

4. Altered conditions of the blood, particularly anæmia; common in girls and young women.

5. General malnutrition of the body, both during and following acute illnesses, such as diphtheria. Also in people whose tissues are loaded with fat.

When a person suspects that he is suffering from heart disease, his wisest course is to consult a physician without delay. His apprehensions are very possibly groundless, and his discomfort may arise from one of the causes mentioned above. The symptoms are very prone to increase if he remains in a condition of uncertainty and worries about himself. Should his suspicions prove correct, no time will have been lost, and the sooner he follows skilled advice the better. There is rarely need for a sufferer from heart disease to despair about himself. The treatment mainly consists in careful diet, avoidance of violent exertion, and attention to the general health. It is no uncommon occurrence for a sufferer to lead a long and useful life, and survive his relations who, though free from his particular complaint, have lived less wisely.

DISEASES OF THE ARTERIES

As age advances there is a common tendency for the arteries to become thickened and stiff, due to degeneration of their walls. Alcoholic excess, gout, and kidney disease have a special tendency to aggravate this condition. As a result of these changes, the walls may be unable to withstand the pressure of the blood, and may become stretched, and form a pulsating swelling, called an 'aneurism,' or they may rupture, and the blood extravasate into the surrounding tissues. The latter is especially common in the blood vessels of the brain, and is the common cause of apoplexy.

Symptoms.—None may exist until the disease is far advanced. Giddiness, headache, and breathlessness are common. The

pulse is 'hard,' and there may be palpitation and sometimes attacks of intense pain over the region of the heart. This is called 'angina pectoris,' or 'breast pang.' It usually comes on after exertion or excitement, and is attended with faintness and a sense of impending death; the pain often shoots into the neck and face, and down the arms. Dropsy, bronchitis, gangrene, and apoplexy may occur.

Treatment.—As for GOUT. The patient should lead a quiet, regular life, and restrict his diet to simple food. Sudden exertion, alcoholic excess, and excitement should be avoided. Constipation must be carefully guarded against. Aneurism and angina pectoris are conditions requiring skilled treatment.

DISEASES OF THE VEINS

The veins may become blocked either through inflammation occurring in their walls, or from certain alterations in the constituents of the blood. The two causes commonly exist together.

Inflammation of the veins.—Acute inflammation, phlebitis, may be caused by a vein becoming involved when the surrounding tissues are diseased or damaged, or by the blood being poisoned by some unhealthy wound, as in pyæmia and septicæmia. Gout and influenza are common causes, and it not infrequently follows childbirth. Persons suffering from varicose veins are peculiarly liable to acute attacks.

Symptoms.—When a superficial vein is attacked the overlying skin is reddened, and the vessel may be felt as a hard, irregular, rounded cord. When a deep vein is affected there is great pain and swelling of the limb, usually without any superficial signs of inflammation. The lymphatics are usually also involved. 'White leg' is a good illustration of the condition.

'White leg' usually occurs during the second or third week after childbirth, and is attended with fever (temp. 101° to 102°). The onset is marked by acute pain in the groin or calf, and within twenty-four hours the limb begins to swell. There may be an enormous increase in size. The skin feels hard, and is of a shiny, white colour. The fever usually subsides after a week

or a fortnight, and the swelling then begins to diminish, but does not altogether disappear for many weeks.

Treatment.—The limb must be kept at absolute rest and elevated on pillows. When a superficial vein is affected the overlying skin may be painted with belladonna and glycerine, and wrapped in cotton-wool, or hot fomentations may be applied. Gout must be treated on general principles. Cases of ‘white-leg’ should be perseveringly fomented, and the pain relieved by the local application of belladonna or laudanum. The constitutional treatment as for FEVER, but the patient’s strength must be supported. When the fever has subsided, the limb may be wrapped in cotton-wool, and bandaged evenly with a flannel roller. Massage or rubbing the limb must on no account be practised. Douching with cold salt and water is useful. The patient must not leave her bed until all swelling has disappeared, and the limb must be used with great caution. The flannel bandage or an elastic stocking should be worn for some months.

Varicose veins are due to a chronic inflammation occurring in the coats of the vessel, causing it to become first thickened, then elongated and dilated. The common causes are distension of the veins from muscular exertion; prolonged standing; garters and tight-lacing; pregnancy. In many cases no obvious cause can be found, and it must be attributed to heredity; many members of one family are often affected. The veins of the leg are most often the seat of the disease; the veins of the anus and lower bowel are often affected, constituting piles, or ‘hæmorrhoids’; also those of the testicle, causing ‘varicocele.’

Symptoms.—Varicose veins feel thick and tortuous, and are often knobbed, due to their being dilated into pouches. These pouches often adhere to and cause thinning of the overlying skin. They may give rise to pricking and aching pain in the surrounding parts, and often cause a sense of weakness and weight in the limb. They are a common cause of ulcers of the leg, and may give rise to profuse venous hæmorrhage. A ‘varicocele’ feels like a collection of worms beneath the skin, and often causes aching pain in the testicle; they almost invariably occur on the left side. Piles, or hæmorrhoids, are elsewhere described.

Treatment.—Garters and tight-lacing should be abandoned.

The limb should be evenly bandaged from the foot upwards, or an elastic stocking worn. These should be put on immediately after the morning bath, and only removed on getting into bed. Persons leading sedentary lives are often benefited by gentle exercise, such as bicycling, in moderation. Suitable cases can be completely cured by operation, the diseased veins being excised. A 'varicocele' may be relieved by wearing a suspensory bandage, but young men wishing to join the army or navy must have the veins removed by operation.

DISEASES OF THE LYMPHATIC VESSELS AND GLANDS

Lymphangitis, *i.e.*, acute inflammation of the lymphatic vessels, is described in the chapter on poisoned wounds, which are usually the cause.

Acute inflammation of the lymphatic glands—adenitis—commonly results from the same causes which produce lymphangitis. It also occurs in cases of erysipelas and diphtheria, and in scarlet fever it is a frequent and troublesome complication.

Symptoms.—Swelling of the glands with pain and tenderness. The glands may at first be felt as separate, rounded bodies, but owing to the tissues around becoming inflamed, their outline is usually soon lost, and simply a swollen mass remains. The pain is at first a sensation of dull aching, or stiffness. The overlying skin may become reddened, swollen, and tender, and may ulcerate, allowing an escape of pus due to suppuration of the glands. When an abscess is forming there is usually throbbing pain.

Treatment.—The local cause must be treated (see LYMPHANGITIS), the inflamed parts kept at rest, and the glands painted with belladonna and glycerine, and hot fomentations applied. If an abscess forms, the matter should be released by a surgeon without delay. Much suffering will be spared and less scar result than if the skin is allowed to break by the use of poultices.

Chronic enlargement.—Tuberculous or strumous glands are common in children and young adults, usually occurring in the glands of the neck. The source of irritation which permits the entry of the microbes is sometimes difficult to discover. In

many cases there is a skin eruption or a sore on the scalp, around the ears, lips, or nose; decayed teeth, ulcerated gums, enlarged tonsils, and discharge from the eyes, nose, or ears are common causes. The chronic enlargement may follow an attack of acute inflammation, but in many cases it appears slowly and painlessly. One or more glands may be affected; when several glands are attacked, the shape of each can be distinguished separately at first, but they become matted together after a time, from the surrounding tissues becoming inflamed. The condition may subside under proper treatment, but in many cases the glands soften and form a cold abscess; the overlying skin slowly ulcerates and the pus escapes. The discharge may persist for a long time, and extensive destruction of skin occur, which leaves an unsightly puckered scar.

Treatment.—When enlarged glands are noticed the source of irritation must be carefully searched for and treated. The diet and general treatment should be conducted on the lines laid down for tuberculosis. Tonics which aid the digestion of meat and fats are probably more useful than the many so-called specifics. Painting the glands with iodine was in former days widely practised, but without obvious benefit. Poulticing is distinctly harmful, and favours suppuration. In many cases the glands begin to subside as soon as the local cause has been cured, and the general health improved by diet and fresh air. If the glands continue to enlarge they should be removed without delay by a surgeon. If they are allowed to suppurate, other glands are almost certain to become affected; and it is useless to send a child away to the seaside in hopes that a glandular abscess, which has thinned and undermined the skin, will become absorbed. A child who has suffered from tuberculous glands or other manifestations should, when possible, be placed at a school by the seaside, and any fresh disturbance should be treated without delay. When medical aid cannot be obtained, should an abscess form and break, it must be dressed with scrupulous regard to cleanliness, and dry dressings used. The abscess cavity should be syringed out daily with tincture of iodine and water (a teaspoonful to the half-pint).

General enlargement of the lymphatic glands attended with marked *anæmia* occurs in leucocythæmia and lymphadenoma. These are comparatively rare diseases, which run a chronic course, and call for skilled treatment.

CHAPTER III

DISEASES OF THE NOSE, THROAT, AND LUNGS

Foreign Bodies in the Nose—Bleeding from the Nose—Discharge from the Nose.—Cold in the Head—Hay Fever—Tonsillitis and Quinsy—Ulceration of Tonsils—Chronic Enlargement of Tonsils and Adenoid Growths—Chronic Sore Throat—Laryngitis: 1. Acute; 2. Chronic.—Croup: Spasmodic Laryngitis; Spasm of Larynx—Diseases of Bronchial Tubes, Lungs, and Pleura: Causation—Bronchitis: Acute; Chronic; Emphysema; Bronchiectasis—Pneumonia—Chronic Pneumonia, or Cirrhosis—Congestion of Lungs—Pleurisy and Empyema—Pulmonary Tuberculosis, Consumption—Asthma.

Foreign bodies in the nose.—Children frequently insert buttons, beads, beans, peas, and the like into the nose. They commonly become frightened, and immediately inform their parents, but occasionally they say nothing, and if the substance is allowed to remain there it causes irritation. Discharge from one nostril in a child is almost invariably due to a foreign body.

Treatment.—Close the nostril on the opposite side, and make the child forcibly blow its nose. After two or three attempts the substance is usually expelled. If this fails, make the child hold its head over a basin, keeping the mouth open, and inject warm salt and water (two teaspoonfuls to the pint) up the opposite nostril with a Higginson's syringe.

Bleeding from the nose.—This may be due to a variety of causes. It frequently occurs in full-blooded people, particularly in the spring of the year. When it occurs in people past middle life, kidney disease may be present. It often occurs during typhoid fever and whooping-cough. It is a grave sign when noticed after blows or falls on the head, as it may be due to fracture of the base of the skull. In weakly children it may be due to picking the nose induced by the irritation which accompanies thread-worms.

Treatment.—In the majority of cases it is rather beneficial than otherwise, and should not be checked unless it continues for a considerable time. The old-fashioned plan of applying a large key to the nape of the neck is often effectual, and any method of applying cold may be used. A mustard-leaf may be used if cold fails. The most effectual method is to make the patient keep perfectly quiet in a half-sitting position on a sofa, and refrain from sniffing or blowing the nose. Small pieces of ice may be sucked and inserted into the nostril, and a piece may be held against the side of the nose and forehead. Powder of tannic acid may be placed in the quill of a pen and blown up the nostril, or a plug of absorbent wool may be inserted and left undisturbed for from three to six hours. In rare cases it may be necessary for a surgeon to plug the nose. If the bleeding recurs frequently, aperients are probably required.

Discharge from the nose.—The most common cause, ‘Cold in the Head,’ is treated separately. Chronic discharge may be due to (1) the existence of *polypus*; this can sometimes be seen on tilting up the end of the nose as a white glistening substance. The nostril is usually more or less completely blocked, though air can more readily be forced out than drawn in. They require removal by a surgeon, and, however skilfully performed, they are very prone to return, and syringing the nose with astringent solutions of salt or tannic acid and water should be persevered with for a considerable time after the operation. (2) Strumous children often suffer from offensive discharge from the nose. It is a serious condition, as there is usually ulceration going on, which may involve the bones and lead to considerable disfigurement. The nose should be syringed with boracic lotion twice a day, and the general health attended to. (See TUBERCULOSIS.) (3) *Abscess* of the cavity enclosed in the bones of the cheek often discharges into the nose. The pus may run backwards into the throat or from the nostril, according to the position of the head. The discharge is usually intermittent, and is very offensive to the patient. The trouble is usually set up by a decayed tooth in the upper jaw. Syringing the nose with boracic lotion may be tried, but is usually futile, and the condition must be treated by operation. (4) Discharge from one nostril in a child is usually due to a *foreign body*.

Cold in the head is undoubtedly infectious, and may be contracted from other sufferers, by exposure to draughts, by sudden alternations of heat and cold, and by getting the feet chilled. It usually begins with a sensation of heat or tickling at the back of the nose or throat, and with chilliness, headache, or other febrile symptoms. Fits of sneezing may occur, and the nose feels stuffy, from swelling of the mucous membrane. After about twenty-four hours, discharge from the nose begins, and gradually increases during the next three days, accompanied by the abatement of the febrile symptoms. The discharge continues for an indefinite time, according to the patient's general health and his mode of life; a person whose occupation compels him to frequently enter stuffy rooms, and then go out into the cold air, usually takes a long time to shake off a cold. More or less anæmia and general weakness usually follows, and there is a tendency in some people for colds to affect the throat and chest, and produce bronchitis. An attack of diarrhœa often occurs, due to catarrh of the intestine.

Treatment.—Persons liable to colds in the head should increase their bodily vigour by outdoor exercise, and cold baths in the morning. They should wear warm socks and thick boots, and change their clothing after being heated by exercise. A hot bath after exposure to cold will often prevent a catarrh. When it is obviously impending, a dose of quinine, gr. 5, may arrest it; free perspiration is sometimes effectual. This may be induced by hot drinks and plenty of warm bedclothing. A teaspoonful of sal-volatile in a tumbler of hot lemonade, hot whisky and water, or Dover's powder, gr. 5 (for an adult), in barley-water, may be taken at bedtime. When the cold has fully developed, medicines have little influence. An even temperature in a well-ventilated room is the best remedy, and delicate children and persons liable to chest affections should keep indoors, and as much as possible to one room, avoiding draughty passages. The common practice of drying a saturated handkerchief and using it again is objectionable for many reasons, the chief being that the patient probably reinfects himself. Inhalations of carbolic or eucalyptus are undoubtedly comforting, and are rational methods of treatment. Spraying the nose with a solution of menthol is useful towards the end of a cold, and diminishes the amount of discharge. There are

some people who suffer from a chronic nasal catarrh that baffles change of air, tonics, and all routine treatment. In these cases the mucous membrane of the nose is usually found much thickened and congested. Great relief is usually experienced if the membrane is cauterised by electricity; the surgeon first paints the interior of the nose with cocaine, and the proceeding is not painful, though it is usually considered to be unpleasant.

‘**Hay fever**’ is a severe cold in the head prevalent in the summer and autumn. It is often associated with asthma, and is started in many cases by inhaling the pollen of flowers and fine dust.

Treatment.—Residence by the sea or on moors may prevent its occurrence. Quinine, grs. 2, taken three times a day, is useful in some cases. A menthol spray, or a powder containing menthol, ʒ1, boracic acid, ʒ2, chloride of ammonium, ʒ3, used as a snuff gives relief. Polypi, or thickening of the nasal mucous membrane, exist in a large number of cases; these conditions require treatment by a surgeon.

Tonsillitis and quinsy.—Acute inflammation of the tonsils may occur independently of scarlet fever and diphtheria, but the possibility of these diseases being present must always be borne in mind. It may be caused by cold or damp, and is particularly common in rheumatic people, and often ushers in rheumatic fever. The onset is marked by sore throat, headache, and aching in the limbs. The temperature is usually high, 102° or 103°, and the patient has a flushed face, and rapid strong pulse. The tongue rapidly becomes coated with white fur. One or both tonsils are found red and swollen, and small white spots are scattered over the surface. The glands behind the angle of the jaw may or may not be enlarged. One tonsil is commonly affected first, and the other follows, after an interval of two or more days. When both are attacked simultaneously, the fever usually only lasts three days, but this may be prolonged if the second tonsil becomes affected after the first has begun to get well. It may also be prolonged by the formation of an abscess in the substance of the tonsil or in the surrounding tissues, constituting a ‘quinsy.’ There is great pain on swallowing, and the swelling may be so great as to seriously embarrass the

breathing. When an abscess forms around or beneath the tonsil, there is pain of a throbbing character, the arch of the fleshy palate is much swollen, usually only on one side, and the tonsil projects, displacing the uvula.

Treatment.—The bowels should be relieved by a free aperient. A mustard poultice or plaster should be applied to the side of the neck, and the skin then oiled, and hot wool wrapped around. Sucking ice relieves the pain, and the throat should be sprayed frequently with chlorine gargle. If there is difficulty in breathing, a steam-kettle gives relief in many cases, but if it fails, there may be an abscess which requires opening by a surgeon without loss of time. Salicylate of soda relieves the pain in rheumatic people. Only small quantities of food can be taken owing to the pain in swallowing, and it must necessarily be in fluid form, such as eggs beaten up in milk. Children should always be kept away from a person suffering from sore throat. It is well to remember that diphtheria has often an insidious onset, and a ‘slight sore throat’ in one person may transmit virulent diphtheria to another. Though enlargement of the glands does not necessarily mean that the throat is infectious, the presence of these, however slight, should be regarded as gravely suspicious. (See DIPHTHERIA.)

Ulceration of the tonsils is rare unless accompanied by other signs of constitutional disease. The cause must be treated.

Chronic enlargement of the tonsils and adenoid growths.—As a result of repeated attacks of tonsillitis or cold in the head, or often in quite young children, the tonsils become permanently enlarged, and associated with them are found fleshy growths at the back of the nose behind the soft palate. The symptoms which draw attention are: (1) The child breathes through the mouth, which is kept constantly open; (2) loud snoring at night; (3) frequent colds in the head; (4) peculiar voice, even when there is no cold; and (5) more or less deafness. In bad cases the chest becomes deformed; a constriction of the chest below the level of the nipples, and pigeon-breast above, is very common. The condition is a serious one for many reasons, the chief being: (1) the difficulty in breathing

causes much muscular effort, particularly at night, when absolute rest is so essential, and the child's blood is imperfectly aërated, consequently the general health suffers; (2) the hearing is impaired, and the changes induced in the ears may become permanent in adult life, consequently education is difficult, and the child usually appears stupid, and often becomes so actually.

Treatment.—Mild cases in children who can be taught to gargle, or who will submit to nose-syringing with astringent solutions—tannic acid, alum, or salt and water, may be treated by these means, but they must be regularly persevered with for many months. Bad cases, and young children who cannot gargle, and will not submit to nose-syringing, must be submitted to operation. Parents often object to this at first, but they find that the daily punishment of a child by syringing its nose is infinitely worse than an operation under chloroform, which occupies a few minutes, and is followed by a few hours' subsequent discomfort. Tonics and sea-air are useful both before and after operation.

Chronic sore throat may result from repeated colds, excessive tobacco-smoking, and prolonged use of the voice. It is usually associated with more or less anæmia. The throat feels dry and irritable, and causes frequent cough and desire to swallow. The condition may be what is called a 'relaxed sore throat'; in this the mucous membrane is slightly swollen and reddened all over, and the uvula looks flabby and elongated. Or it may be a 'granular sore throat'; in this condition the mucous membrane looks nodular and roughened, and there are irregular patches and streaks of redness, looking in some cases as though it had been smeared with raspberry jam.

Treatment.—All sources of irritation and all exertion of the voice must be avoided. Change of air and tonics are usually needed. Astringent lozenges or gargles, or a menthol spray, should be used; chloride of ammonium or chlorate of potash are good in slight cases. A 'granular' throat often requires treatment by electro-cautery.

Laryngitis.—1. *Acute*: may be caused by cold; fevers, such as measles and diphtheria; inhaling irritating vapours,

such as strong ammonia; and swallowing foreign bodies, hot fluids, or caustics. The symptoms are hoarseness or complete loss of voice, cough, discomfort or severe difficulty in breathing, with 'crowing' or 'croupy' inspirations. All the symptoms are usually worse at night.

Treatment.—Absolute rest; the patient should talk as little as possible, and only in a whisper. At the beginning, ice should be sucked, and mustard poultices or plasters applied externally. A steam-kettle containing tincture of benzoin or eucalyptus should be kept going, or the same vapours frequently inhaled from a jug. Lozenges and gargles are useless or harmful. The bowels should be opened by a free aperient. In severe cases, leeches applied over the larynx often give relief, but no time should be lost before seeking medical advice, as the difficulty in breathing may rapidly increase and suffocation occur.

2. *Chronic*: may follow an acute attack, or be due to excessive use of the voice, or tobacco-smoking, to tuberculosis, and other constitutional diseases. It may also be caused by the formation of warts or other growths in the larynx.

Symptoms.—Hoarseness, frequent cough with little expectoration, and sore and pricking sensations. In tuberculous disease there is usually much pain on coughing and swallowing, and the expectoration is usually profuse; other symptoms due to affection of the lungs usually follow.

Treatment.—(See that for CHRONIC SORE THROAT.) In tuberculous cases the constitutional treatment is all-important. Owing to the difficulty of applying local remedies, the condition is often most intractable, and chronic laryngitis should not be allowed to run on without proper advice.

Croup.—This expression is popularly used to include several diseases of childhood which are accompanied by difficulty in breathing and noisy, crowing inspiration. These are—

1. Acute laryngitis.
2. Diphtheria of the larynx, sometimes called 'membranous croup.'
3. Spasmodic laryngitis.
4. Spasm of the larynx.

The symptoms and treatment of acute laryngitis and

diphtheria are described elsewhere, and may be recognised by their more gradual onset and the constitutional symptoms which are usually present; but the spasmodic forms of croup must now be described. They are the most common forms in children, particularly

Spasmodic laryngitis.—This occurs in children between two and seven years of age, during which period a child may suffer from repeated attacks, occurring at rarer intervals as the child grows older, and are practically unknown after adolescence. They almost invariably occur at night. The common course of the attack is, that the child has a slight cold and cough during the day, and the voice becomes somewhat husky at bedtime. He goes to sleep, but is awakened by a barking cough and difficulty in breathing, accompanied by loud crowing inspiration. The child looks intensely anxious, and the lips may become blue, but a fatal termination is almost unknown. The attack may last for a few minutes, or as long as two hours, and then rapidly subside; the child usually falls asleep, and awakes perfectly well next day, or there may be barking cough left for a few days.

Treatment.—A child who suffers from repeated attacks of croup should have the nose and throat examined for polypi and enlarged tonsils, as after these have been removed the attacks often disappear. Warm clothing should be worn, chills guarded against, and the food, particularly the last meal, should be easy of digestion. Sea-air is distinctly beneficial. During the attack there should be no sign of hurry or alarm shown by the nurse; the child is sufficiently frightened already, and should be reassured by quiet words and movements. Cloths or sponges should be wrung out in hot water and placed round the neck. A mustard poultice applied over the lower part of the neck is useful. One or more leeches often act like a charm in severe cases. An emetic, such as ipecacuanha wine, one or two teaspoonfuls, should be given. Vomiting usually gives relief. An undigested meal is often the cause of the attack.

Spasm of the larynx occurs in very young children from six months to two years of age, and is commonly due to nervous irritation caused by teething, or rickets. The attacks come on at any time, and often several times, in the twenty-four hours. There are no preliminary symptoms, such as cough. The child

catches its breath, the veins of the face become distended, and convulsions may occur; after a few seconds the breath is drawn in with a crowing noise and the attack passes off. In many cases there is no actual crow, but the air enters by a series of jerking movements of the chest.

Treatment.—Prompt aid must be rendered during the attack. The tip of the tongue should be seized and drawn forward out of the mouth, and cold water dashed on the chest and head with a sponge. If the attacks occur at frequent intervals, a warm bath (temperature 98°) should be kept ready, and the child placed in it, and cold water poured over the chest and back immediately. Plunging a child into a hastily prepared hot bath is a risky proceeding, and many severe cases of scalding have occurred in this way. The bowels should be regulated and the diet attended to (see RICKETS). Lancing the gums of a teething child may cause the attacks to disappear. Bromide of potassium, gr. 3, may be given every six hours.

TABLE SHOWING THE DIFFERENCE BETWEEN

	Spasmodic Laryngitis	Spasm of the Larynx
Age of child.	Two to seven years.	Six months to two years.
Causation.	Cold and damp. Indigestion. Enlarged tonsils. Adenoids.	Rickets and teething.
Attacks.	Preceded by cough.	No warning.
Time and number.	At night.	Any time during the twenty-four hours. Often several.
Duration.	A few minutes to two hours.	A few seconds.
Risk to life.	Slight.	Considerable.
Treatment.	An emetic.	Cold sponging face and chest.

DISEASES OF THE BRONCHIAL TUBES, LUNGS, AND PLEURA

The anatomy of these organs must be remembered, as disease often commences in one part and extends to another.

Three terms are constantly used to indicate inflammation of structures which may be affected, either primarily or by extension:—

1. Bronchitis, meaning inflammation of the bronchial tubes.
2. Pneumonia, meaning inflammation of the substance of the lungs.
3. Pleurisy, meaning inflammation of the pleura covering the lung and lining the chest.

In addition to these, the term 'broncho-pneumonia' is used when the smaller bronchial tubes and the lung substance are both affected, and 'pleuro-pneumonia' means inflammation of the lung together with the pleura covering it.

It very often happens that an inflammation starting in one part gradually invades other structures. Thus a cold in the head may give rise to laryngitis, which leads to bronchitis, followed by pneumonia. When pneumonia reaches the surface of the lung, the pleura usually becomes affected.

The causes of inflammation of these structures are : (1) Exposure to cold and wet; (2) infectious fevers, particularly measles, influenza, typhoid, and whooping-cough. (3) tuberculosis; (4) inhaling irritating vapours and dust; (5) the pleura is particularly liable to be affected in rheumatic fever, and by injuries to the chest-wall, such as fractured ribs.

Bronchitis.—1. *Acute.*—*Symptoms.*—These vary according to the severity of the attack. Mild cases are often called bronchial catarrh. Fever rarely very high (100° or 101°), except in children, who are liable to affection of the smaller tubes, when it may amount to 103° or 104° . Tickling, aching, or sense of constriction in the chest. Irritable cough, at first dry, but soon glairy mucus is brought up, which, after a few hours, is followed by yellow rounded pellets of mixed mucus and pus. There may be pain in the pit of the stomach due to the incessant cough. In severe cases the signs of fever may be intense, expectoration scanty or absent for a considerable period, and when secreted, it may be coughed up with great difficulty. The breathing becomes rapid, the pulse feeble, fluid accumulates in the bronchial tubes, and asphyxia may occur.

2. *Chronic* bronchitis often follows an acute attack, or may be caused by repeated colds on the chest, and is particularly common in old people.

Symptoms.—Fever is usually absent. A chronic cough with expectoration of thick yellow mucus, usually most abun-

dant in the morning. Acute attacks often occur, and aggravate the condition. As a result of long-continued bronchitis with habitual cough the lungs may become stretched and lose their elasticity, from the air-cells being dilated and ruptured; this condition is called *emphysema*. The chest looks barrel-shaped, and in breathing the whole chest moves up and down, but without expanding and contracting as it does in health. Consequently only a small quantity of air is driven out at each breath, and the patient becomes distressed on slight exertion. In some cases the bronchial tubes become greatly dilated, and irregular recesses form in connection with them; this condition is called *bronchiectasis*. The prominent symptom, in addition to those of chronic bronchitis, is the occasional expectoration of large quantities of horribly offensive mucus, which has collected and been retained in the recesses of the tubes.

Treatment.—In acute attacks the patient should be confined to a warm room (temperature 65°), and treated as for fever. Perspiration should be induced, and secretion from the bronchial tubes promoted, by saline diaphoretics and warm drinks. Dover's powder, gr. 5, may be given in addition. A moist atmosphere relieves the cough; a steam-kettle, or a jug containing hot water and compound tincture of benzoin or eucalyptus, and the steam inhaled, may be used. Counter-irritation should be applied to the chest. When the fever has subsided and the secretion is free, stimulating expectorants should be given. Restless nights, due to the cough, are a source of distress; opium is invaluable for this condition, but must be given with the greatest caution to young children and old people with failing pulse. In *chronic bronchitis* the main points of treatment consist in promoting the general health and improving the circulation. Stimulating expectorants combined with ammonia should be given, and cod-liver oil is useful in patients who are ill-nourished. When the weather is warm and sunny, the patient should live out of doors as much as possible. The treatment for *emphysema* is the same. In *bronchiectasis*, inhalations of eucalyptus or carbolic should be persevered with.

Pneumonia.—When the inflammation starts in the lung the onset is usually sudden. In some cases there is a day or

two of feverish malaise, but a rigor in adults, and vomiting or convulsions in children, as a rule mark the onset, followed by a sudden rise of temperature (102° to 105°) and symptoms of acute fever, with pain in the chest. The breathing is rapid and shallow, the cough is frequent, short, and 'barking,' at first dry, but soon attended with sticky mucus stained with blood. The appearance of the expectoration is usually described as being 'rusty,' but it may become a deep brownish red, like prune-juice. Clusters of minute blisters often appear about the lips and the nostrils. The temperature remains continuously high, though it is slightly lower in the mornings than in the evenings, for a variable time, three to fourteen days, when it may fall as suddenly as it rose, or it may gradually subside. When pneumonia occurs as a complication of bronchitis, infectious fevers, or other diseases, the onset is usually insidious, and rigors are rare. Even cough may be absent. Embarrassed breathing and the temperature continuing high may be the only symptoms, and the true nature of the condition of the lungs can only be judged by ski led examination of the chest.

Treatment.—The less medicine given the better. Calomel, gr. 3, may be given at the onset to full-blooded adults. Bed in a warm, well-ventilated room, and the air kept moist with steam. Fluid food. Counter-irritation to the chest and a wool or flannel jacket. Fever should be treated by sponging. Under certain circumstances, bleeding, leeching, or cupping are invaluable. Cough mixtures are useless. Thirst should be relieved by a free supply of lemonade or cold water. When the pulse becomes weak, the tongue dry, and there is muttering delirium, alcohol should be given; large doses are often required.

Chronic pneumonia, cirrhosis, or fibroid phthisis may follow repeated attacks of pneumonia, chronic bronchitis, and pleurisy, and occurs in workpeople who are constantly inhaling dust-laden air. The course of the disease is usually of long duration, and the symptoms are those of chronic bronchitis, attended by progressive emaciation, weakness, and breathlessness.

Treatment.—Pure air, good diet, particularly fatty food, stimulants, and tonics which aid the digestion.

Congestion of the lungs is a term in popular use loosely applied to every form of inflammatory affection of the chest. It is more properly used to indicate the condition of the lungs which occurs during the later stages of exhausting diseases, in people with feeble circulations and advanced heart disease, and in aged and bedridden people. The symptoms are weakness, difficulty in breathing, and cough with watery expectoration, sometimes streaked with blood.

Treatment.—Heart stimulants and tonics. Bedridden people should, when possible, be frequently shifted in bed.

Pleurisy.—The symptoms vary according to the extent and intensity of the inflammation, by the co-existence or not of pneumonia, and by the secretion or absence of fluid. In mild cases there may be no fluid—*dry pleurisy*—the pleura simply becoming roughened; but in many cases fluid is secreted to a greater or less amount, from a few ounces to two or three quarts—*pleurisy with effusion*. The fluid as a rule is yellowish and transparent, but may become turbid, and sometimes forms pus; the condition is then called *empyema*.

In mild cases there is only slight fever with stitch or pain in the side, and the patient may continue his work until he is well, or he may find his breathing becoming short, and on going to a doctor, the affected side of the chest may be found full of fluid. In the more severe cases there is a sense of illness, occasionally a rigor and fever, though the temperature rarely rises above 102°. Almost from the beginning there is pain in the chest, frequently referred to the region of the nipple, which is variously described as a stitch, pricking or throbbing pain. In some cases there is great pain complained of in the shoulder or side of the neck; this is referred pain due to pleurisy situated under the base of the lung. Cough may be absent, but is usually present, though with little secretion, and the patient always endeavours to suppress it, owing to its aggravating the pain. The patient instinctively does his best to limit the movements of the chest; draws shallow, quick breaths, talks in short sentences, and commonly lies on the affected side. When fluid is secreted, the pain diminishes or disappears, but the fever continues, and the shortness of breath may increase, owing to the lung becoming compressed. In

favourable cases the fever subsides after a few days, and the breathing becomes more natural; there may be a recurrence of pain as the fluid is absorbed, due to the roughened surfaces of the pleura coming in contact again. In other cases, in spite of the fever disappearing, the difficulty in breathing remains or increases, due to the fluid not being absorbed, and the lung being compressed. Or, again, the fever may continue or increase, and the general symptoms become aggravated; this may be due to the onset of pneumonia, or the presence of an empyema.

Chronic pleurisy.—In some cases the fluid, though small in quantity, is not absorbed for a long period, or may fluctuate from time to time, and the general health continue impaired. These cases are always suspicious of tuberculosis being present.

Treatment.—Rest in bed, a diaphoretic at the onset, and vigorous counter-irritation of the side affected. No method is so effectual in relieving pain as thoroughly strapping the affected side, in the way described for fractured ribs. In the absence of strapping, a flannel roller, or many-tailed bandage may be applied to the chest. Fluid food should be given and the bowels regulated. In former days the patient used to be bled, purged, sweated, and fed on dry food to prevent the formation of fluid. It is doubtful whether this treatment ever had the desired effect, and the patient may be allowed to drink freely. When there is difficulty in breathing due to accumulated fluid, every form of treatment is inferior to tapping the chest, which must be performed by a surgeon. If accumulations of fluid are allowed to remain in the chest, the lung may become permanently compressed, or an empyema may form. An empyema is a grave condition, requiring a far more serious operation than tapping the chest, which is practically free from risk in skilled hands. During the convalescence from pleurisy, tonics are needed, and counter-irritation in the form of painting with iodine is advisable for a few weeks. Any exertion which causes pain should be avoided.

Pulmonary tuberculosis, phthisis, or consumption.—The causation of tuberculosis is given elsewhere (p. 290). The onset is usually insidious. There may be loss of flesh and strength without any obvious cause, or the same symptoms may

follow an ordinary cold which cannot be shaken off, or an attack of blood-spitting may be the first symptom. When the disease has developed, the common symptoms are—(1) Cough attended with more or less abundant expectoration like that of chronic bronchitis. (2) Blood may be brought up, either simply occurring as streaks in the phlegm, or in quantities amounting to a severe hæmorrhage. (3) Hectic fever. (4) Loss of flesh and strength. (5) Profuse perspirations, especially at night. The cough is usually frequent and hacking, sometimes dry, or attended by scanty, glairy mucus, but as the disease advances the expectoration becomes more purulent and abundant. Hæmoptysis, *i.e.* blood-spitting or hæmorrhage from the lungs, is very common; there may be small quantities of blood mixed with the phlegm, or a pint or more may suddenly be brought up, causing choking or fainting. Shortness of breath and pain or discomfort in the chest are common. The tongue may continue clean and the appetite good until the disease is far advanced, but the stomach and intestines are apt to become infected at any time. This is shown by the tongue becoming furred or raw-looking, loss of appetite, and attacks of diarrhœa. The onset of the disease is sometimes sudden, and the course very rapid, a fatal termination occurring in a few weeks or months. These cases closely resemble pneumonia in the early stages, and typhoid in the later, when profuse diarrhœa is common.

Tuberculous pleurisy may follow an acute attack, or the onset may be insidious; loss of flesh, shortness of breath, and the gradual effusion of fluid, being more common than acute pain. Symptoms pointing to the substance of the lung, or other parts of the body becoming affected, usually supervene.

Treatment.—The general treatment of tuberculosis is described on p. 290. Tuberculosis of the lungs must be treated on the same principles, *i.e.* fresh air, liberal diet, and tonics which aid the digestion; not by cough mixtures. It may be necessary to relieve the *cough* in order to promote sleep, and small doses of tincture of opium may be given in the form of a linctus. A small piece of mustard plaster placed over the larynx is often successful. The *night sweats* may be diminished by sponging the body with tepid vinegar and water, and by a draught containing dilute sulphuric or hydrochloric

acid; the night-dress should be of flannel, and frequently changed if it becomes saturated; the bed-clothing should be light. *Bleeding from the lungs*, if severe, is best treated by absolute rest and a full dose of opium. The patient's head and shoulders should be slightly raised on pillows, so that he can get rid of any blood in the mouth without the slightest exertion. He must not be allowed to talk, and if he requires the bed-pan, he must be lifted on to it without assisting himself in any way. Small pieces of ice should be sucked, and all food given tepid or cold. An ice-bag may be placed on the chest. Stimulants must be forbidden. The astringents, tannic acid, turpentine, &c., are of little use in bleeding from the lungs. After a severe hæmorrhage the patient must be kept at rest and on fluid food for a week; the bowels must be kept regular, but purging avoided. When the expectoration is only slightly stained with blood, avoidance of exertion, excitement, and alcohol, is usually sufficient.

In fine warm weather the patient should be wheeled out of doors 'in spite of cough, fever, night-sweats and hæmoptysis' (Osler).

Asthma is a disease of nervous origin, often hereditary and affecting several members of one family. It is intimately associated with hay-fever and spasmodic laryngitis, and is a frequent complication of chronic bronchitis and emphysema. In many cases a chronic nasal catarrh or nasal polypi appears to be the predisposing cause. The exciting causes are numerous, and vary in different individuals—dust, the smell of hay or certain flowers, the odour of animals, fright, and indigestion. Some patients are worse in towns, some in the country; a London fog starts an attack in one individual, the sulphurous fumes of a railway tunnel relieve another.

Symptoms.—The patient may go to rest feeling perfectly well, or with a sense of constriction in the chest, and falls asleep. After a few hours, usually in the early morning, he awakes gasping for breath, and with a feeling of imminent suffocation. He makes violent efforts to breathe, but has great difficulty in getting air into the chest, and even more in expelling it. The breathing is wheezy and shallow, but not rapid. The expression becomes anxious, the hands and feet

cold, the body bathed in perspiration. The attack may last a few minutes or several hours, and may return after a short intermission. A fit of coughing usually follows the first signs of improvement, and continues at intervals for the next few days. The expectoration is very sticky and difficult to get up, and consists of peculiar rounded pearly pellets, and a small quantity of watery fluid.

Treatment.—Asthmatics should have the nose and throat examined, and treated if necessary. The diet should be simple, the principal meal taken at midday, and a light supper several hours before going to bed. No hard and fast rule as to climate can be laid down, but moorland is usually preferable to sea-air. In severe attacks the inhalation of a few drops of chloroform gives relief, but this should only be resorted to under medical advice. Blotting-paper, dipped in a solution of nitrate of potash and dried, may be burnt, and the fumes inhaled, or the paper may be rolled and smoked like a cigarette. Many forms of powders ('Himrod's,' 'Bliss's') and cigarettes ('de Joy,' 'Walden's,' &c.) are sold, and give relief in many cases. The active ingredients are stramonium, lobelia, and nitrate or chlorate of potash, combined with various other drugs; one form often gives relief when another has failed. Saline expectorants are useful, after the attack has passed off, to loosen the phlegm.

CHAPTER IV

DISEASES OF THE DIGESTIVE SYSTEM

The Teeth : Toothache ; Facial Neuralgia ; Gum-boils ; Tartar—Teething, Disorders of—Sore Mouth : Thrush ; Ulceration ; Chronic Ulcers—Inflammation of Gums—Diseases of the Stomach and Intestines : Indigestion ; Flatulence ; Colic ; Diarrhœa ; Vomiting ; Sea-sickness ; Constipation ; Diseases of the Stomach ; Diseases of the Intestines ; Diseases of the Vermiform Appendix and Cæcum ; Diseases of the Peritoneum ; Intestinal Obstruction ; Rupture or Hernia ; Intestinal Disorders in Children ; Diseases of Rectum and Anus ; Intestinal Worms.

THE TEETH

DECAY of the teeth may be due to (1) malnutrition of the body during infancy ; (2) the administration of mercury, commonly in the form of teething powders ; (3) the teeth being too crowded in the jaws ; (4) the enamel being cracked by biting hard substances ; (5) neglect of cleanliness, the food accumulating and fermenting between the teeth. The teeth should be brushed at least once a day, and if this is not repeated at night, the mouth should at any rate be rinsed out thoroughly before going to bed. Hard brushes, and gritty tooth-powders containing charcoal or cuttle-fish, should be avoided, as they damage the surface of the teeth and cause the gums to recede. Quinine, gr. 20, myrrh, ʒ2, and precipitated chalk, ʒ2, make an excellent tooth-powder, which is all the better if a little soap is used with it. When food is allowed to lodge in the teeth, it becomes acid through fermentation and softens the enamel, causing a form of ulceration called ‘caries.’ When once a cavity has formed, it is almost impossible to keep it cleansed, and it will go on extending unless ‘stopped’ or ‘filled’ by a dentist. When the nerve-endings situated in the deeper parts of the tooth are reached, pain begins to be felt. It is far wiser to attend a dentist regularly and have any

cavities filled before they begin to cause pain, than afterwards. It used to be said that dentists were too fond of extracting teeth; but at the present day, if they err at all, it is on the side of too often refusing to extract a tooth. If people would make it a rule to attend a dentist at the end of every six months, they would, in the long run, save themselves much expense and suffering. When teeth are extensively decayed, proper mastication of the food is impossible, the digestion is impaired, and the general health suffers. The local effects of decayed teeth are toothache, facial neuralgia, gum-boils and swollen face.

Treatment (1) of **toothache**.—Search should be made for a cavity in the painful tooth, and if one is found, it should be carefully cleared of any food and washed out with warm water; a minute pledget of cotton wool should then be placed in it to dry the cavity; this is then removed, and another pledget, dipped in a drop of menthol solution, oil of cloves, oil of peppermint, or tincture of iodine, is then inserted and left in for six hours, or it may be changed before if necessary. If no cavity can be found, drying the gum and painting it with one of the above-mentioned applications is useful; they all, with the exception of menthol, cause some burning and stinging when first applied.

(2) **Facial neuralgia**.—Nine cases out of every ten are due to disease of the teeth. In many cases the teeth themselves are perfectly comfortable, and the patients cannot believe that the pain they suffer from in the forehead, temple, ear, or cheek, can be due to a cavity in a tooth, and are only convinced by the pain ceasing when the tooth has been stopped. This form of neuralgia is usually relieved by food with stimulant, and quinine in doses of 5 grains.

(3) **Gum-boils** are due to an abscess forming in a tooth and the pus making its way out between the fang and the socket, or by penetrating the bony socket. There is usually intense pain at first, but this is followed by swelling and throbbing of the face, while the pain in the tooth itself diminishes. The swelling of the face is due to the escape of the pus from the tooth socket into the tissues of the cheek. When possible, the tooth should

be extracted without delay. As a palliative, a cavity should be searched for and cleansed, but *not* filled with wool, and the mouth repeatedly washed out with hot water. A gum-boil may be known by its forming an elastic, tender swelling by the side of the gum, often with a yellow head where the pus is about to penetrate. This may be safely opened by winding a piece of tape round the blade of an abscess-knife so as to leave only the point and one-third of an inch of the blade bare, and then thrusting it into the abscess, directing the point rather inwards towards the jaw, and not outwards into the cheek. The mouth should then be frequently washed out with hot boracic solution or weak Condly. Hot cotton-wool, or a water-bottle placed against the cheek, gives relief, but poultices and fomentations should not be used.

Tartar is a hard substance, derived from the salts of the saliva, which tends to collect on the teeth in positions which escape polishing by friction. It is particularly common at the backs of the lower front teeth. It causes an irritable condition of the gums, and makes the teeth liable to become loose.

Treatment.—When a considerable deposit has formed it must be removed by a dentist, the process being called ‘scaling.’ Fresh deposits may be prevented by brushing the inner surfaces of the teeth, and by passing the point of a fine quill between the teeth after each meal.

Teething, disorders of.—The time of the appearance of the teeth has been stated in the chapter on the HYGIENE OF INFANCY AND CHILDHOOD. Some children cut their teeth without any suffering, but the majority suffer from occasional feverish attacks, accompanied by symptoms of irritation of the skin, mucuous membranes, and nervous system. The common symptoms are dribbling, swelling and tenderness of the gums, and restlessness at night. The infant often looks pale, and is drowsy during the day, but towards evening flushes up, sleeps only for a short time together, and wakes up screaming. There is thirst, but only a small quantity taken at a time; and there is often diarrhœa, with undigested milk-curd present in the motions. Wheezy breathing, without any true bronchitis, is often present, but inflammatory conditions of the chest are very

liable to arise. If there is profuse perspiration, crops of minute red spots, popularly called 'red-gum,' appear on the skin, and add to the restlessness from the itching they cause; eczema is also common. The most grave condition is the occurrence of convulsions, often attended or caused by 'spasm of the larynx' (see CROUP); these rarely occur except in badly fed rickety children.

Treatment.—The *fever* and *restlessness* are best treated by a warm bath (temperature 90°) given the last thing before the child is put to bed. Wheezy breathing and bronchitis need not prevent this. For *diarrhœa*, the food should be well diluted if the child is being bottle-fed, and castor oil (ten drops) given three times a day. The *skin eruptions* should be dusted with a powder containing boracic acid, after the evening bath. *Convulsions* are best treated by placing the child in a warm bath and sponging the face and head with cold water; if they recur, place the child in a mustard-bath. It may be necessary to have the gums lanced. The drug of all others which gives relief during teething, and which has in consequence been used far too freely, is mercury, given in the form of grey powder. If used too frequently, the second set of teeth are irrevocably damaged. One grain of grey powder may be mixed with a little white sugar and divided into three. One of these powders (containing gr. $\frac{1}{3}$) may be given on three successive nights. The three powders should not be given more often than once a month, except under medical advice. During teething, the child should be clothed lightly but warmly, kept out of draughts, and should not be taken out of doors on cold, wet, and windy days. The much-advertised teething-syrups and teething-powders should on no account be used, and a nurse detected in administering them should be immediately discharged.

SORE MOUTH

Two forms of inflammation of the mouth are common during teething and acute fevers, such as measles and pneumonia :—

1. Swelling of the mucous membrane of the cheeks and gums with patches of intense redness, often accompanied by the formation of white exudation and shallow ulcers.

2. '**Thrush,**' characterised by the presence of minute raised white spots or patches. The mucous membrane is swollen and red, or sometimes looks healthy.

Treatment.—The mouth should be sponged out with boracic lotion or weak Condý after every meal, and the surfaces rubbed with borax and honey applied with the finger. The bowels must be regulated with small doses of rhubarb and soda, and chlorate of potash, gr. 2, in water one teaspoonful, may be given three times a day.

Acute ulceration with offensive discharge occurs in badly fed children, most often after measles or scarlet fever. Portions of the jawbones often perish, and the cheek may slough.

Treatment.—These are severe conditions requiring skilled treatment. It consists in maintaining the patient's strength, keeping the mouth constantly washed out with antiseptic solutions, and the application of strong caustics.

Chronic ulcers and fissures may arise on the lips, the tongue, and the cheeks in middle-aged and old people, and in sufferers from tuberculosis and wasting diseases. These cannot be treated by domestic remedies; the most grave consequences may follow the neglect of prompt and skilled treatment.

Inflammation of the gums.—Besides teething and the other above-mentioned conditions, the gums may become swollen and tender in—

1. Mercurial poisoning. The edges of the gums are red, and then swelling takes place. The flow of saliva is profuse, the breath offensive, and there is a metallic taste in the mouth.

Treatment.—Discontinue the mercury, wash the mouth out with chlorate of potash.

2. Lead poisoning. Blue line on the gums. Loss of appetite, constipation, and colic. Marked anæmia.

Treatment.—Sulphate of iron, gr. 3, dilute sulphuric acid, ℥15, sulphate of magnesia, ʒ1, water ʒ1, three times a day.

3. Chronic arsenical poisoning. Gums, mouth, and eyelids red. Thirst and soreness of stomach. Diarrhœa.

Treatment.—Remove the cause—medicines, wall-papers, painted toys. Iron tonic. Barley-water.

4. Scurvy, due to deprivation of vegetable food, and occurs in infants fed too strictly on boiled milk and patent foods.

Treatment.—Vegetables, lime-juice, and fresh meat for adults. Raw-meat juice, fresh milk, and orange-juice for infants.

5. ‘Bleeders.’ See HÆMOPHILIA.

DISEASES OF THE STOMACH AND INTESTINES

It must be remembered that these organs form one continuous canal, and, as in the respiratory tract, there is a tendency for inflammation starting in one part to gradually invade others by extension. In addition to this, the thinness of the intestinal walls renders it a comparatively common occurrence for an inflammation or catarrh of the mucous membrane lining the bowel to extend through the wall, and involve the peritoneum which forms the external covering. For the purposes of description, affections of these organs are somewhat artificially divided into :—

1. Diseases of the stomach, or gastric diseases.
2. Diseases of the small intestine, such as enteritis.
3. Diseases of the colon or large intestine, such as colitis and dysentery.

It is very common for the small intestine to become affected, either as the result of, or simultaneously with, a disorder of the stomach. This condition, very common in young children, is called ‘gastro-enteritis.’ When both the small and large intestine are involved, the term ‘entero-colitis’ is sometimes used. Inflammation of the peritoneum is called ‘peritonitis.’

In all affections of these organs, abdominal pain, nausea or vomiting, constipation or diarrhœa, are the prominent symptoms usually present to a greater or less degree. It is often impossible to decide what part of the intestinal canal is chiefly affected, but—

Vomiting coming on early, and frequently repeated, points to the stomach or upper part of the small intestine being the seat of the trouble.

Diarrhœa is a marked feature in disease of the small intestine.

Diarrhœa, with the passage of mucus and blood, and a sense of fulness and tension in the rectum after the bowels have

acted (tenesmus) are common symptoms in diseases of the colon.

Vomiting, constipation, acute tenderness of the abdomen, and fever, are commonly present in peritonitis.

Tenderness of the abdomen, however slight, must always be taken as an indication for caution. As a general rule, when there is abdominal pain, increased by pressure, *no aperient in any form* should be given, and absolute rest and fluid diet should be enforced. In all cases of abdominal pain, the ileo-cæcal region (see DIAGRAM OF THE ABDOMEN) should be examined for tenderness by making gentle pressure with the flat of the hand; if this causes pain, appendicitis and typhoid fever are the two common diseases which should be suspected, and their early recognition is all-important.

Indigestion—Dyspepsia.—The complex muscular and chemical processes which constitute digestion are performed in health without our being conscious of them. When discomfort, instead of a sense of well-being, accompanies digestion, the term dyspepsia is applied to the condition. This term is used to cover a variety of symptoms, which may be brought about by an infinite number of causes. The more common are:—

Improper food, or too large a proportion of a particular kind, meat, fat, or vegetables.

Too much fluid: tea, coffee, soup, and sloppy food.

Too much alcohol; particularly if taken between meals.

Too little food, too much food, or too little variety.

Irregularity in taking food; meals taken too close together during the day, and too long a period of fasting between the last meal over-night and breakfast.

Sedentary habits and dull, solitary meals. ‘Meat teas.’

Sour bread, pastry, and hot buttered cakes.

Decayed teeth, and consequently imperfect mastication of the food; hurried meals, and ‘bolting’ food.

Excessive tobacco-smoking.

Faulty conditions of the blood; anæmia, gout, and rheumatism.

Mental emotions: grief, worry, and excitement.

Constipation.

The symptoms commonly associated with dyspepsia are:—

1. Variations in the appetite: distaste or absolute loathing for food in some cases; constant emptiness, craving for food, or voracious appetite in others.

2. Discomfort or pain, usually referred to the pit of the stomach, or frequently between the shoulder-blades. These sensations may come on immediately after a meal, or when the stomach is empty. They may be described as gnawing or aching, a sense of distension, burning or griping pain.

3. Flatulence and eructations are some of the most common and troublesome symptoms. The gas is given off by the decomposition of the food.

4. Alterations in the tongue, which may be either coated or raw-looking; often coated down the centre and raw along the edges.

5. Bitter or sour tastes in the mouth, particularly in the morning on first rising.

6. A feeling of sickness (nausea) or actual vomiting, which may occur immediately after a meal or when the stomach is empty of food, simply mucus or bile being ejected.

‘Heartburn’ is a sense of heat in the pit of the stomach, accompanied by the eructation of an acrid fluid which stings the throat.

‘Water-brash’ is the vomiting of a clear fluid, sometimes in large quantities, usually when the stomach is empty of food. It is generally preceded by severe pain in the stomach, and is common amongst people who largely subsist on rough food such as oat-cake.

7. Headache, giddiness, irritability, depression and sleeplessness. Palpitation of the heart. Affections of the skin: eczema, nettle-rash, and acne. Alterations in the urine. Constipation, or diarrhoea with the passage of undigested food.

The following are common forms of indigestion, with their more or less characteristic symptoms enumerated, and the special treatment indicated. The frequency with which they occur varies according to the social conditions of patients, but the neuralgic form is more common than all the others amongst the well-to-do inhabitants of towns.

Condition causing Symptoms	Occurs in	Caused by	Symptoms	Treatment
Excessive gastric secretion.	Persons of all ages, hysterical females past middle age; gout.	Food, excessive in quantity, indigestible; cheese, excess of fatty food.	Tongue coated or raw; appetite good; distension, flatulence, palpitation, spasm, heartburn; bowels usually constipated.	Regulate diet; rhubarb, bicarbonate of soda, and sal volatile after food. 'Soda mints.'
Deficient gastric secretion.	Nervous or anæmic adults, usually males.	Sedentary living, excessive tobacco-smoking, and tea-drinking.	Tongue pale, flabby, marked by teeth, coated. Nausea; sense of sinking; food in small quantities taken often; distension after food; nervous symptoms; depression, irritability and sleeplessness; bowels constipated.	Exercise; nux vomica, and nit. hyd. acid after food.
Gastric irritation	1. Girls or young women.	Anæmia.	Tongue pale; appetite often good, afraid to eat; meals followed by pain, relieved by vomiting; bowels constipated.	See CHRONIC GASTRITIS. Food in easily digested form, often; bismuth and iron.
	2. Adults.	Alcohol.	Tongue large, flabby, tremulous, and coated; or small, glazed and raw-looking. Appetite capricious; morning vomiting; pain or discomfort shortly after meals, flatulence, bowels loose, undigested food.	Temperance; saline aperient in morning; nux vomica and hydrochloric acid after food.
Neuralgia of stomach and intestines.	Gouty or rheumatic children or adults.	Sugary and starchy foods, irregular meals, cold and damp.	Tongue clean, tip and edges raw and roughened; appetite capricious, pain, often cramp—no constant relation to food, usually some time after nettlerash or eczema common; bowels irregular; diarrhoea easily excited.	Warm clothing; quinine; animal food, milk, eggs, fish, meat, toast, <i>not</i> bread; avoid sugar and farinaceous puddings.

General rules of treatment.—Persons suffering from indigestion should consider in what way their daily life and diet may be the cause, and alter these accordingly. Generally, animal food is more easily digested than vegetables and starches. Salt-meat, pastry, sugar, sweetmeats, stewed fruits, jams, and marmalade must be avoided; potatoes should be taken sparingly, and toast is better than bread. Tea, coffee, and soups must be taken in great moderation. The less fluid taken with the meals the better, but water may be freely drunk on getting up in the morning and on going to bed. The bowels should be regulated by saline aperients taken before breakfast. If this is not sufficient, aloes in the form of aloin or a compound rhubarb pill may be taken at night. This is more fully dealt with under the heading of CONSTIPATION.

Flatulence is best treated by limiting farinaceous food, avoiding green vegetables; and very little fluid should be drunk with the meals. If the abdomen becomes distended, hot fomentations of turpentine should be applied, and ‘soda-mints,’ rhubarb or sal volatile given. Bismuth and bicarbonate of soda, given half an hour before a meal, may prevent its occurrence.

Colic is severe griping pain in the abdomen, often accompanied by flatulence, vomiting, and either diarrhœa or costiveness. It is a symptom common to many affections, and will be frequently referred to.

The treatment depends on the cause. When due to indigestible food, or wind, there is absence of fever, and the pain is relieved by pressure. Under these circumstances, an aperient in the form of compound rhubarb powder, gr. 30, or powdered rhubarb and bicarbonate of soda, gr. 10, of each, or castor oil, ʒ2, followed by soda-mints or sal volatile, should be given, and hot fomentations applied to the abdomen. An enema of warm oil and turpentine may also be given.

When the pain is increased by pressure, or if there is fever, aperients must be avoided, and special treatment adopted. (See GASTRITIS, ENTERITIS, APPENDICITIS, PERITONITIS, DYSENTERY, INTESTINAL OBSTRUCTION, and RUPTURE.)

Diarrhœa, or looseness of the bowels, is a symptom common to many diseases. (See BILIOUS ATTACK, ENTERITIS, SUMMER DIARRHŒA, CHOLERA, TYPHOID FEVER, DYSENTERY, TUBERCULOSIS, and INTESTINAL DISORDERS IN CHILDREN.)

Vomiting may indicate the onset of an infectious fever such as scarlet fever, or may be due to indigestible food or poisons (see GASTRITIS), or inflammation of the intestines or peritoneum (see ENTERITIS and PERITONITIS), or to nervous irritation (see NERVOUS DISEASES).

Sea-sickness is a form of shock due to exhaustion of the nervous mechanism which regulates the equilibrium of our bodies. The same condition is produced in some persons when travelling in a train, and is largely due to strain of the eyes when looking at a succession of moving objects.

Treatment.—When travelling, either by boat or by train, persons liable to sea-sickness should clothe themselves warmly, and avoid looking at passing objects. They should lie flat on their backs or, in a train, seat themselves with their backs towards the window, and refrain from looking out. Bromide of potassium is probably the most efficacious of the many drugs recommended. Some people can stave off sea-sickness, at any rate for some hours, by taking a light meal an hour before starting, followed by a cup of strong black coffee. When the preliminary nausea is felt, small quantities of brandy and soda-water may be taken; if this does not act as a preventive, the presence of the fluid in the stomach makes the act of vomiting easier. Taking some form of fluid immediately after vomiting usually relieves the acute distress of straining which occurs when the stomach is empty. In long voyages, the sufferer should remain on deck when possible, and may take small quantities of iced champagne or brandy and soda; meat juices, such as Valentine's, diluted with water, can often be retained, and the strength supported, until the sea-sickness passes off, and other food can be taken.

Constipation or costiveness.—A confined state of the bowels may be caused by:—

1. Irregularity in responding to the calls of nature.
2. The habit of taking strong aperients for trivial bodily discomforts, with the result that the bowel accustoms itself to the irritation caused by medicines, and will not respond to the natural stimulus of food.
3. Sedentary occupations.
4. Faulty diet, too little fluid being taken, or the food containing too little

residue after digestion. 5. Enfeebled bodily health, such as anaemia and nervous depression. 6. Perversion of the secretions of the digestive organs, commonly termed a 'sluggish liver,' usually due to errors in diet or to the too frequent use of purgatives during childhood. 7. Acute diseases, accompanied by fever. 8. Pregnancy. Habitual constipation is accompanied by a feeling of depression and abdominal discomfort. The tongue becomes coated, the complexion sallow, and there is loss of appetite. The loaded bowel may press on the veins and interfere with the return of blood from the lower parts of the body, producing piles and varicose veins.

Treatment.—An attempt should always be made to regulate the bowels by attention to the laws of hygiene before resorting to medicines. The habit of retiring at the same hour every day, whether the inclination to relieve the bowels is felt or not, is of the utmost importance. A tumbler of hot water taken before going to bed and before breakfast is often effectual. Laxative articles of diet, such as brown bread, porridge, vegetables, fresh fruit, figs, prunes, and olive oil, should be taken. Exercise which necessitates the action of the abdominal muscles, such as rowing, lawn tennis, and digging in a garden, is particularly beneficial. It may be necessary to take a laxative, such as cascara, confection of senna, or a saline aperient before breakfast for a few days until regularity is established, and a glycerine suppository may be inserted, or two teaspoonfuls injected, to ensure an action. In more obstinate cases a soap and water enema should be injected, and a tablespoonful of castor oil taken to commence with, followed by laxatives for the next three or four days. Persons confined to bed, or leading sedentary lives, may be compelled to take an aperient every day. For these, a pill containing extract of nux vomica, gr. $\frac{1}{2}$, aloin and cascara in varying proportions (see PURGATIVES) taken at night, and a saline aperient in the morning, are useful. Cases of constipation attended with pain in the abdomen and vomiting, should avoid aperients taken by the mouth, and trust to enemas. (See INTESTINAL OBSTRUCTION.)

Sufferers from piles must take preparations containing aloes with caution, as the condition may become aggravated. Mercurials, such as 'blue pill,' calomel, or grey powder, should not be taken habitually.

Diseases of the Stomach

Acute inflammation.—Acute gastritis, acute gastric catarrh, or acute dyspepsia, may exist in two forms, which must be described separately:—

1. The mild form, acute dyspepsia or ‘bilious attack,’ is common in children, from taking food which has begun to decompose, particularly in hot weather; in adults, from over-eating or the abuse of alcohol. It is usually attributed ‘to the salmon’ after a big dinner, but too many other dishes, too much wine, and too many cigars, are the real factors.

Symptoms.—Abdominal discomfort, headache, nausea, and vomiting. In children there is usually fever and diarrhœa. The tongue is coated, the breath offensive. There may be patches of shingles about the mouth, or a general eruption of nettle-rash.

Treatment.—The less food given the better for the first twenty-four hours. The vomiting is beneficial, and should not be checked. Ice may be sucked, and small quantities of milk largely diluted with soda-water or lime-water drank. A dose of castor oil may be given to adults, fluid magnesia to a child. After the first twenty-four hours, if the patient has not recovered, bismuth and bicarbonate of soda should be given before food, and beef-tea or diluted milk given in small quantities.

2. The severe form, sometimes called ‘gastric fever,’ may be caused by poisons produced by microbes in food, or by irritating poisons, such as strong caustics, arsenic, mercury, phosphorus, &c.

Symptoms.—Intense burning pain and tenderness over the pit of the stomach. Constant vomiting, food being first ejected, then bile, mucus, and often blood. There is intense thirst, but often pain and difficulty in swallowing. In many cases collapse rapidly occurs, with cold sweats and the passage of bloody urine, or there may be complete suppression.

Treatment.—During the acute stage no food should be given by the mouth; nutrient enemata must be employed. Counter-irritation to the pit of the stomach; a mustard-leaf, followed by hot fomentations sprinkled with laudanum. Ice may be sucked and small quantities of cold water taken. If the condition is

caused by poison, the nature of which is known, the special treatment must be adopted (see POISONING). Opium is usually required in full doses to relieve the pain, but this requires skilled judgment. During convalescence enemata should be used, in preference to aperients by the mouth: bismuth and bicarbonate of soda should be given, and the diet selected as for chronic gastritis.

Chronic gastritis and ulcer of the stomach.—This condition may follow an attack of acute inflammation of the stomach, or may arise from long-continued errors of diet (see DYSPEPSIA), the abuse of alcohol and tobacco, and in chronic disease of the kidneys, tuberculosis, gout, and anæmia. In many cases the symptoms are vague, or embrace many of those mentioned under the head of dyspepsia. Those occurring as a result of chronic alcoholism are described in Diseases of the Liver. Anæmia is the common cause in women, and frequently leads to the formation of an ulcer. The symptoms are:—

1. In mild cases, capricious appetite, followed by oppression or actual pain after eating. Vomiting often follows soon after a meal, relieving the pain, but is succeeded by sensations of sinking and emptiness. There is usually some tenderness over the stomach. The other symptoms of anæmia are present, breathlessness on exertion, irregularity in the monthly periods, and constipation.

2. In severe cases, accompanied by ulcer, there is intense burning pain after food, referred to the pit of the stomach or the back, often so severe as to make the sufferer afraid to eat. There may be an acutely tender spot felt on pressing the pit of the stomach. Vomiting is common, and gives relief to the pain. The vomit often contains blood, either in small or large quantities. It may be fluid and bright red, or altered by digestion so that it resembles coffee-grounds. It is sometimes so profuse as to cause fainting. People who have suffered from gastric ulceration often complain of gnawing pain, which comes on an hour or two after a meal, and is only relieved by taking food. This is probably due to thickening of the stomach-wall, which prevents the organ from collapsing when empty; hence the sensation of acute hunger unless distended with food.

Treatment.—The less severe forms of gastritis should be treated by saline aperients, given in the morning, and restriction of the diet to easily digested food. Raw vegetables and fruit, alcohol, and salt meats must be avoided. More severe cases should avoid meat altogether, and live on eggs, milk, custard pudding and the like, given in small quantities frequently, at regular intervals. When there is vomiting of blood, the patient must go to bed, take no food of any sort by the mouth, and be fed by nutrient enemas. Ice may be sucked to relieve the thirst, and cold water taken in small quantities. Mustard-leaves, or some form of irritation, should be applied to the pit of the stomach. At the end of a week, small quantities of diluted milk, or white of egg in water, may be taken by the mouth, in addition to the enemas. The quantity of milk may be gradually increased, and beef-tea and custard puddings added. A month should elapse before any form of solid food is taken, such as poached eggs, minced or scraped meat. The patient should be kept practically in bed for two months at least, and another month must elapse before it is safe to relax the most rigid attention to diet. The medicinal treatment consists in the administration of iron. (See ANÆMIA.)

Bleeding from the stomach, however profuse, is rarely fatal. The treatment consists of keeping the whole body, and the stomach in particular, in a condition of absolute rest. Medicines, such as tannic acid and other astringents, given by the mouth to check the bleeding by causing clotting of the blood, are probably positively harmful. If a large clot is produced, it irritates the stomach, aggravates the vomiting, and increases the hæmorrhage. It is far better that the blood should remain fluid and flow away by the intestine. Opium in some form, such as laudanum, $\text{m}20$, in a dessertspoonful of cold water, should be given, small pieces of ice sucked, and a mustard-leaf placed over the stomach. Subcutaneous injections of morphia, given by a physician, are the most satisfactory means of giving rest. Sulphate of soda, or the artificial Carlsbad salts, grs. 60, dissolved in two tablespoonfuls of water, may be required each morning to check constipation and wash out clot. The feeding must be effected by means of nutrient enemas. (See TREATMENT OF CHRONIC GASTRITIS.)

Cancer of the stomach is a disease of middle and advanced age. The symptoms are those of intractable chronic gastritis, with emaciation. The disease is not capable of improvement by domestic measures. Skilled advice should be sought if the disease is suspected. The majority of persons who suspect that they have cancer of the stomach are suffering from chronic dyspepsia.

Diseases of the Intestines

Inflammation of the small intestine—enteritis—"summer diarrhœa."—*Causation*.—The same as gastritis. Frequently attributed to cold or chill, but is more commonly met with in the summer months, and decomposing food is probably the cause in the majority of cases. It may also be due to acute diseases, such as typhoid, cholera, and tuberculosis; also to injury of the intestine, either from without, as in strangulated ruptures, or from irritating bodies within the intestine.

Symptoms.—Abdominal pain and diarrhœa in most cases. The diarrhœa varies in character, according to the severity of the attack. When the motions are very frequent, the stools contain bile at first, but gradually become lighter in colour, until only clear watery fluid is passed. Portions of undigested food are often present. Jaundice may occur. As a rule there is little or no fever, but in some cases there is high temperature, with distension of the abdomen, and obstinate constipation may be present, instead of diarrhœa. These cases are difficult to distinguish from peritonitis, and are always a source of anxiety. The condition is seen in children who have been given too active an aperient for some slight stomach upset. When the bowel is inflamed by being strangulated, there is constipation with severe vomiting (see RUPTURE).

The diarrhœa may become chronic.

Treatment.—The common cases of diarrhœa due to indigestible or decomposing food are readily treated, but a word of caution is necessary. If there is fever, abdominal pain increased by pressure, *i.e.*, abdominal tenderness, or a rupture which cannot be replaced, *every form of purgative must be avoided*. If these symptoms are absent, two teaspoonfuls of castor oil, or two grains of 'grey powder,' may be given, followed after an interval of an hour by $\text{m}1\text{õ}$ of laudanum or chlorodyne,

for an adult. The treatment of diarrhœa in children is dealt with separately. Solid food must be avoided; milk diluted with lime or soda water may be given, and the thirst relieved by sucking ice, or by barley or arrowroot water. The most important element in the treatment is rest in bed. If the diarrhœa continues at the end of forty-eight hours, an astringent mixture containing opium, catechu and sulphuric acid (see APPENDIX) may be given. Enemas of opium and starch mucilage are also useful. Medical aid should be sought without delay for those cases attended with tenderness of the abdomen, fever, rupture, or severe vomiting. Absolute rest, hot fomentations to the abdomen, the thighs bent by placing a pillow under the knees, and fluids in small quantities, is the only safe treatment until the doctor arrives. When skilled advice is unobtainable, opium should be given, and if there is constipation, the bowels should be relieved by enemas, not aperients. The popular idea, that a dose of castor oil does no harm to anybody, is occasionally marked by fatal exceptions. (See RUPTURE and APPENDICITIS.) Chronic diarrhœa is best treated by rest in bed, milk diet, bismuth by the mouth, and large enemas of boracic solution (see DYSENTERY).

Note.—‘English Cholera,’ *i.e.* an acute gastro-enteritis attended with severe vomiting and diarrhœa, closely resembles Asiatic Cholera, and must be treated on the same lines.

Inflammation of the large intestine, dysentery, or colitis.—The causes of inflammation of the colon are similar to those which produce disease in the rest of the intestinal canal. Impure water, bad food, fatigue, and chills after exertion, pave the way, if they are not the actual cause of the disease. It is particularly common in marshy countries, and is intimately connected with malaria in the tropics.

The characteristic symptoms are diarrhœa, with the passage of mucus and blood, griping pain in the abdomen, and a sense of straining and distension of the rectum. There may be a preliminary period of constipation, or looseness of the bowels, with loss of appetite and general malaise. The motions are at first semi-solid, and passed without pain, but they increase in frequency, and soon consist of small hard faecal lumps, with mucus and blood, attended with severe griping and involuntary

straining; finally nothing is passed except mucus and blood in severe cases. Fever is not necessarily present, but there is usually some elevation of temperature, and if malaria also exists, it may reach 103° or 104° . Enlargement of the liver is common in severe cases occurring in the tropics, and is sometimes followed by the formation of abscess.

Chronic dysentery may follow an acute attack, or the characteristic symptoms may appear after repeated attacks of ordinary diarrhœa. There is rarely so much pain, and the passage of blood and mucus is intermittent. The abdomen is usually distended, and there is tenderness along the course of the colon.

Treatment.—Rest in bed. Milk diluted with lime or soda water, whey, meat-juices or peptonised milk. Mustard-leaves, followed by hot fomentations to the abdomen. If there has been constipation before the attack, a saline aperient (sulphate of soda or magnesia, $\mathfrak{z}2$) or calomel, gr. 1, or grey powder, gr. 2, should be given. This should be followed by powdered ipecacuanha, in large doses (gr. 20), every six hours. If the first dose is vomited, laudanum, $\mathfrak{m}20$, should be given half an hour before the second dose. When the pain ceases, and an action containing bile and fæces takes the place of blood and mucus, the ipecacuanha should be discontinued, and salicylate of soda and bismuth given.

In chronic dysentery the patient should be kept at rest, and his diet restricted to milk and meat broths. Much persuasion is required in persevering with this treatment. The bowels should be regulated by mild aperients, and large doses of bismuth (gr. 20) should be given four times in the twenty-four hours. Copious enemata of boracic solution should be given daily. The patient should lie on his back, with the hips raised on pillows. The fluid, at a temperature of 100° , must be placed in a douche-can raised about 2 feet above the level of the bed, and allowed to flow into the bowel by the force of gravity. The quantity of fluid injected must depend on the tolerance of the patient, but from 2 to 4 pints should be used.

Inflammation of the vermiform appendix and cæcum.—Appendicitis, typhlitis or peri-typhlitis is a common affection,

and may be due to chronic constipation and the formation of ulcers in the cæcum, to irritation from purgatives, indigestible food, seeds and stones of fruit, intestinal worms, and cold, particularly in gouty people. In the majority of cases the inflammation starts in the vermiform appendix. The symptoms of onset are variable: they may follow an attack of acute indigestion or diarrhœa; but in a large number of cases there is only a vague sense of uneasiness or distension at first in the pit of the stomach, but this gradually becomes more acute, and settles down into the neighbourhood of the right groin. There is usually nausea, and a feeling that if vomiting were to take place, or the bowels were to act, relief would follow. Vomiting is common, aggravating the pain, and though the bowels may act slightly at first, constipation soon occurs. There is usually some fever; occasionally a rigor marks the onset; a temperature of 102° or 103° is common. When the disease has fully developed, the tongue is coated, the bowels are completely confined, the abdomen is distended, there is marked tenderness over the cæcum, and a hard, acutely tender lump may here be felt in some cases. This lump is due to inflammatory exudation, which may develop into an abscess. When pus forms, the temperature continues high, and unless relieved by operation general peritonitis may occur, and is almost invariably fatal.

Treatment.—In no disease is absolute rest from the very beginning more important. The patient should be immediately put to bed, and pillows placed under the knees, slightly raising the thighs. He should on no account be allowed to leave his bed for any purpose. Every form of purgative must be withheld. During vomiting, ice may be sucked, and beef-tea or milk and soda may be given, but not more than two tablespoonfuls at a time. Opium, gr. 1, laudanum \mathfrak{m} 15, or chlorodyne \mathfrak{m} 15, should be given immediately, and repeated twice in the twenty-four hours. Hot fomentations, frequently renewed, should be applied to the abdomen, and glycerine and belladonna may be painted on. A warm olive oil or soap and water enema may be given immediately, and repeated every other day until the bowels act. Fluid diet must be persisted in until the bowels act naturally, and all tenderness in the abdomen has completely disappeared; slops may then be given cautiously.

A relapse is extremely common if solid food is given too soon. Under the most favourable circumstances, relapses are liable to occur without obvious cause, and may make the patient live in a state of constant anxiety. Constipated and gouty persons may be able to avoid future attacks by keeping the bowels regular with saline aperients and the use of salicylate of soda. Young patients who have suffered from two or more attacks, showing a tendency to future relapses, should submit themselves to operation. The vermiform appendix can be removed by skilled hands, with but little risk to life, in suitable cases.

Diseases of the Peritoneum

Inflammation of the peritoneum may be acute or chronic, localised or general.

Acute localised peritonitis may be caused by blows on the abdomen, by an inflammation of the mucous membrane extending through the intestinal wall, as in appendicitis, or by injury to the intestine, as when a loop forming a rupture becomes nipped. The symptoms closely resemble those of appendicitis—abdominal pain and tenderness, vomiting and constipation. The pain is usually referred to the neighbourhood of the navel, but the tenderness is localised to the part affected.

Treatment.—As for appendicitis. Absolute rest, avoidance of purgatives, opium, hot fomentations, and liquid food.

Acute general peritonitis may occur from the extension of a localised inflammation, from the admission of air and microbes into the abdominal cavity by wounds penetrating the belly-wall, or by rupture or ulceration of the stomach or intestines, and escape of their contents. Some of the most rapidly fatal cases are due to perforation of a gastric ulcer, a typhoid ulcer, or to an abscess due to appendicitis. In these cases there is sudden and severe pain in the abdomen, which rapidly becomes hard and distended. The least movement or pressure aggravates the pain. The patient lies on his back, with the knees drawn up, breathes with short quick breaths, and speaks in a whisper. There is usually frequent vomiting, and absolute constipation. In many cases collapse occurs

early, and the patient dies within twenty-four hours from the onset. In less acute cases there may be high fever with rapid, hard, small pulse. The patient rapidly emaciates, and the abdomen becomes enormously distended. Life is rarely prolonged beyond a week; but in some cases the fever subsides, the vomiting ceases, the bowels act, and convalescence takes place.

Treatment.—(1) Preventive. Blows on the abdomen should be followed by rest in bed and fluid diet; abdominal wounds should be treated with the utmost regard to cleanliness. Inflammatory affections of the abdomen with tenderness should be treated by fluid diet, rest, and the avoidance of purgatives. (2) When the disease is fully established the condition is at best a desperate one. Life can sometimes be saved by surgical interference. The medical treatment consists in keeping the bowels at rest by full doses of opium, and counter-irritation to the abdomen. Vomiting usually makes any attempt at feeding by the mouth futile, and nutrient enemata must be resorted to. Ice may be sucked, and small quantities of well-diluted or peptonised milk and meat juices may be given.

Chronic peritonitis is usually met with in tuberculous patients. There is emaciation and hectic fever, and the abdomen is swollen and tender. The bowels are irregular, constipation alternating with diarrhoea.

Treatment.—As for tuberculosis. Life may be saved by surgical measures in some cases.

Intestinal Obstruction

The bowels may become obstructed suddenly, or the condition may arise insidiously. The cause is frequently impossible to be determined even by the most skilled observers. The condition may arise (1) from mechanical causes external to the intestinal wall, such as constrictions in the aperture of a rupture or pressure by a tumour; (2) from mechanical causes inside the intestine, such as the impaction of hard faecal masses or gall-stones, or cancerous growths obstructing the passage; (3) From changes in the intestinal wall itself, such as inflammation, enteritis or peritonitis, causing paralysis of the muscular coats.

Acute obstruction is most commonly due to peritonitis, or to a rupture becoming strangulated. The symptoms closely resemble those of acute peritonitis, whatever the cause may be, and consist in the sudden onset of vomiting, and severe abdominal pain. (See PERITONITIS and RUPTURE.) The bowels are either absolutely confined, or mucus and blood may be passed.

Chronic intestinal obstruction is usually accompanied by attacks of vomiting, coming on at irregular times, with colic, flatulence, abdominal distension, and constipation alternating with diarrhœa. Irregularity in the bowels is an almost constant, and often a misleading symptom. Patients suffering from chronic obstruction often seek advice for diarrhœa. It is due to irritation of the intestine from retained fæces and excessive secretion of fluid.

Treatment.—Acute obstruction is a grave condition requiring skilled treatment. In the absence of medical advice, the treatment should be conducted on the lines laid down for appendicitis, and all forms of purgative medicines must be avoided. If a doctor has been sent for, *opium should not be given* before he arrives, as by so doing the symptoms may be modified, and it may be impossible for him to detect the cause of the illness. Chronic obstruction is usually mistaken for indigestion, and advice is only sought after the ordinary household remedies for constipation and diarrhœa have failed.

Rupture or Hernia

A rupture is a protrusion of some portion of the abdominal contents through an aperture in the belly-wall. This most often occurs at the navel or in the groin, where the abdominal wall is weaker than at other parts. A slight protrusion at the navel is extremely common in children and corpulent women, but the groin is the usual seat of a rupture in adults. It may be caused by shocks, such as are produced by falls or jumping from a height, by sudden strains, or by a chronic cough in an emaciated person. The contents of a rupture usually consist of a piece of omentum, a loop of intestine, or both, forming a tumour under the skin, which increases in size on coughing, and when pressed by placing the hand on it, may be felt to slip

back into the abdomen, often with a gurgling sensation. A loop of intestine sometimes becomes constricted in a rupture so that the contents of the intestine pass along with difficulty, or are completely prevented. When a loop of intestine cannot be replaced, and the passage of the contents is absolutely obstructed, it is called a '*strangulated hernia*,' a very serious condition. A rupture may appear for the first time and become strangulated immediately, or it may occur in a rupture which has existed for years. The symptoms of strangulation are pain at the seat of the tumour, which feels hard and tender, intense pain in the abdomen accompanied by vomiting, and desire to relieve the bowels. One motion may be passed followed by absolute constipation. In many cases the symptoms of shock set in rapidly, and a strong active man may become collapsed in a few hours. Unless the strangulation is relieved, the vomiting becomes incessant, and the vomited matter, after the contents of the stomach have been ejected, may consist of a dark evil-smelling fluid.

Treatment.—A surgeon should be consulted in every case of rupture. Many diseases simulate a rupture, and may be aggravated by wearing a truss. It is impossible to cure a rupture by medicines, electricity, or electropathic belts. Very many cases can be absolutely cured by operation; the remainder require properly selected and well-fitting trusses. When a rupture protrudes, the patient should lie down, and if the tumour is in the groin, draw the leg up on the same side so as to relax the muscles, and without hurry or roughness make gentle and steady pressure until the rupture is felt to slip back. If he is not successful, he should remain lying down, and call for assistance. A surgeon should be immediately sent for, and meanwhile cold should be applied to the swelling, and the patient remain lying down with pillows under the knees, but no opium or any form of medicine or food should be given. A bag containing ice, resting on the swelling, is best, as the combined cold and gentle pressure often makes the rupture slip back without further assistance; but cold in any other form may be applied. If surgical help is unobtainable, a second attempt to press back the swelling may be made after the cold has been applied for one hour. Meanwhile no food should be taken, as vomiting may be induced, and the patient should not rise from

the bed if there is desire to relieve the bowels. In the absence of a surgeon, rest and starvation is the best treatment. Under these circumstances opium in full doses may be given, and teaspoonfuls of water may be taken. Stimulants and purgatives are equally injurious. The rupture sometimes slips, or may be pressed back when the patient is faint and collapsed. If at the end of twenty-four hours the symptoms persist, food may be injected by the bowel. It is now improbable that the intestine will slip back without operation; but if the patient is kept quiet he may live long enough for ulceration of the bowel to occur, and relief be obtained by the formation of an opening in the skin over the swelling.

A slight rupture, or 'starting of the navel,' is very common in young infants after the navel-cord has separated. A broad flat pad, such as a penny wrapped in old soft linen, should be sewn on to the flannel binder, and applied over the protrusion. The small rounded pads usually sold are useless, if not injurious. The condition almost invariably disappears as the child grows older, but boys sometimes require to be circumcised.

Intestinal Disorders in Children

Intestinal disturbance is extremely common in infants and children, and usually plays a prominent part in their illnesses. It has already been mentioned that an attack of vomiting or diarrhoea in a child takes the place of a rigor in an adult, and is often the first symptom of the onset of an acute illness, such as scarlet fever, pneumonia, or influenza. It is particularly common during teething, and a marked symptom, if not the cause, of rickets.

Regular hours for feeding, the selection of proper food, the scalding of milk, and scrupulous cleanliness of all food-containing vessels, are the surest means of preventing intestinal disturbance. (See HYGIENE OF CHILDHOOD.) Breast-fed infants suffer far less than those brought up by means of the bottle; but even these favoured infants occasionally suffer from *diarrhoea*, *flatulence*, and *colic*, usually due to some errors in diet on the part of the mother, or to the child being fed too often or at irregular times. The child is restless, and has fits of screaming, the legs are drawn up, and the abdomen feels hard and dis-

tended. Vomiting may occur, and the milk be returned immediately after suckling, or after an interval, when curdling has taken place. The motions are usually curdy, from undigested food.

Treatment.—Regulate the mother's diet, and feed the child regularly. Give the child a teaspoonful of lime-water before putting it to the breast, and do not allow it to suck for more than a quarter of an hour at a time. If the breast is not emptied, the remainder should be drawn off by a breast-pump. During an attack of wind, a teaspoonful of equal parts of lime and dill water, or cinnamon or peppermint water, should be given, or half a 'soda-mint' dissolved in two teaspoonfuls of water. Warm fomentations to the abdomen give relief. If the bowels are irregular, either constipated or loose, two grains of rhubarb and soda should be given three times a day. When the infant is bottle-fed, the food is probably too concentrated, too large in quantity, or taken too quickly. It is sometimes necessary to make repeated changes in the food before one is found to suit, and in some cases a wet-nurse is indispensable. The first step to be taken is to give the food rather more diluted, and to prevent the infant from taking it too quickly. Lime-water should be given, but not in too large quantities, as, owing to its being alkaline, the gastric juice may be neutralised. The medical treatment is the same as for breast-fed infants.

Constipation in an infant is best treated by the injection of a teaspoonful of olive oil, or equal quantities of glycerine and olive oil, into the bowel. Half a teaspoonful of Maltine may be mixed with the food, or a teaspoonful of fluid magnesia or manna, gr. 5–10, may be given. Kneading the abdomen gently with the oiled hand is also useful.

Vomiting without diarrhœa, coming on suddenly, and accompanied by fever, is usually due to irritation caused by indigestible or tainted food, or may mark the onset of an infectious fever. In some children it occurs frequently, and is commonly called a 'bilious attack.'

Treatment.—Rest the stomach by withholding all food, and give small quantities of ice, or soda-water only, for the first twenty-four hours. If the vomiting persists on the second day,

clear out the bowels with a soap and water enema, and give nutrient enemas. If the vomiting has ceased, give small quantities of veal-tea, beef-tea, or whey, alternated with barley or arrowroot water at regular intervals. Milk is best avoided until the child becomes hungry, when it may be given well diluted with barley-water. Castor oil, $\text{m}20\text{--}30$, or grey powder, gr. $\frac{1}{2}$ –1, may be given if constipation is obstinate, but oil or soap and water enemas are safer. The food must be increased cautiously.

Vomiting and diarrhœa is very common in hot weather, and may be so severe as to closely resemble cholera. The child is at first restless and irritable, and extremely thirsty, but vomits everything as soon as it is swallowed. The child rapidly becomes collapsed in severe cases, and within a few hours a plump healthy-looking baby may look wizened and shrunken, with pale face and sunken eyes. However ill the child looks, there is the possibility of recovery ; the disease often lasts a week or ten days, and the condition may appear hopeless, when cessation of the vomiting occurs, and the child begins to recover. Not infrequently, after a period of improvement the vomiting returns, and though not so severe as before, the child drops into a condition of chronic malnutrition.

Treatment.—The child should be kept in a cool, airy room, and all evacuations should be immediately removed. It is best to isolate the child from any others in the house, and any milk or food which has been in the sick-room should not be consumed by other children. At the onset an aperient should be given, to remove any irritating substance from the intestine. Castor oil, $\text{m}30$, or grey powder, gr. $\frac{1}{2}$, should be given twice in the first twenty-four hours. Grey powder is preferable if the vomiting is severe. All milk food should be stopped if the child is bottle-fed, and whey or veal tea, with an equal quantity of barley or arrowroot water, given. If the child is feverish it should be placed in a bath (temp. 100° and cooled down to 90°) for fifteen minutes. Counter-irritation, or hot fomentations, should be applied to the abdomen. Salicylate of soda, gr. 1, and bismuth, gr. 2, may be given every three hours to an infant ; or small doses of grey powder (gr. $\frac{1}{4}$) at similar intervals until gr. 3 have been given, to older children, followed by salicylate of soda and

bismuth. Stimulant, in the form of brandy, is necessary if there are signs of collapse—a teaspoonful in the twenty-four hours, for an infant, given in small doses at a time, with arrow-root water. There is a great temptation to give opium, but it is particularly dangerous to children in this condition, and should not be given without medical supervision.

Chronic vomiting and diarrhœa, attended with wasting, sometimes follow an acute attack, or may come on during convalescence from whooping-cough or measles. In the majority of cases it is due to the child being overfed, or fed at irregular times, but if attended by fever it is gravely suspicious of tuberculosis. Drinks of milk given at all times, whenever a child is thirsty, is a common cause of delayed convalescence. The child occasionally vomits, the tongue is white and coated, the abdomen distended, and the motions are loose, offensive, and curdy.

Treatment.—Chronic intestinal disturbance is a grave condition, for which skilled advice should be sought. The food should be given, well diluted, in small quantities, at absolutely regular intervals. It is often necessary to withhold milk, and give whey or meat-juices. The whey and cream mixture often succeeds admirably, but it may be necessary to peptonise the food. Irritating matter should be removed from the intestine by small doses of castor oil, or grey powder, to begin with, followed by a mixture of salicylate of soda and bismuth, and occasional doses of rhubarb and soda. As the motions become smooth and less frequent the food may be cautiously increased. Change of air, either to a bracing seaside place or on a moor, often acts like a charm.

Indigestion is particularly common in the children of gouty or rheumatic parents, and resembles the neuralgia of intestine which adults suffer from, and which is briefly mentioned in the table of common forms of indigestion. These children are often most carefully fed by their parents on what are popularly supposed to be the wholesome forms of food, oatmeal porridge and farinaceous puddings. They are commonly thin children with clean or raw-edged tongues, complaining of stomach-ache without obvious cause. Uric acid crystals are often to be found in the urine. Eczema or nettle-rash is common. The bowels are

irregular, usually either constipated or loose, and are difficult to regulate.

Treatment.—The symptoms usually rapidly disappear if the child is dieted. Farinaceous food should be reduced to a minimum, and animal food in the form of milk, eggs, fish, butter, and all forms of meat, except beef and pork, substituted. Oat-meal porridge, pastry, sugar, jams, stewed fruits, and rhubarb are particularly injurious. Potatoes should be given very sparingly, and bread should be thoroughly toasted. Fresh ripe fruits, such as oranges, grapes, and bananas, may be taken. Strawberries usually disagree. Fluid magnesia, taken in the early morning, is the best aperient. It is very important that woollen clothing should be worn next the skin.

Diseases of the Rectum and Anus

Pain or difficulty in relieving the bowels, irritation around the anus, and the passage of mucus or blood, are the common symptoms of disease of these regions.

Piles or **hæmorrhoids** are varicose veins of the lower part of the rectum and anus. They may be due to sedentary habits, luxurious living, disease of the liver, constipation, an attack of diarrhœa, pregnancy, and are often attributed to sitting on a damp seat. In many people there is no obvious cause except heredity. When the veins inside the bowel are affected (internal piles), they produce different symptoms from those due to affection of the veins of the anus (external piles). Internal piles are usually painless, though they may cause a sense of fulness and dragging in the bowel, but draw attention by their bleeding more or less profusely, and are hence sometimes called ‘bleeding piles.’ External piles, on the other hand, form rounded tumours, which rarely bleed, but are liable to become inflamed, and are often extremely sensitive, giving great pain every time the bowels act. When acutely inflamed, a pile may become strangulated, and form a dark purple lump, causing such throbbing pain that the patient can hardly sit or walk. External piles vary in size from time to time, and may give little or no trouble for a long period, and then suddenly swell and cause

intolerable pain. Internal and external piles often exist together.

Treatment.—The bowels should be regulated, but purging avoided. The patient should lie down for a few minutes after the bowels have acted, so as to allow the blood, which distends the veins during the act of passing a motion, to flow away. The habit of relieving the bowels just before going to bed is a good one for sufferers from piles. Internal piles sometimes project through the anus, and should be gently replaced. Cleanliness is most important, and is best effected by bathing the parts with clean soft rag and cold water. An injection of cold water into the bowel helps the passage of a motion. The best laxatives to use are confection of senna, liquorice powder, or cascara. Compound rhubarb pills and other preparations of aloes are best avoided. A suppository containing cubebs is most useful for the bleeding from internal piles, and galls and opium ointment is a popular and good remedy for both forms of piles. When piles become inflamed, the patient must be kept at rest, fed on slop diet, and the parts assiduously fomented with hot lead and opium lotion. When a pile is strangulated, immediate relief is experienced by a surgeon incising and turning out the clot. The above methods of treatment are at the best only palliative, and if much blood is lost, or pain is frequent, the sooner the veins are removed by operation the better.

Fissure or ulcer of the anus often accompanies piles, or may be due to laceration of the mucons membrane by a constipated motion, or to the imperfect healing of a superficial abscess. There is sometimes a minute wart, or elevation of the mucous membrane at the anus, marking the seat of the fissure, which is situated just inside the orifice, but the characteristic symptoms are intense burning, smarting, or throbbing pain every time the bowels act, and persisting for some time afterwards. The motion is often streaked with mucus and blood, but any profuse loss of blood is rare. The bowels are usually constipated, and there is spasm of the muscle guarding the orifice, so that no motion can be passed without great straining. The patient often refrains from relieving the bowels for several days from dread of the pain, thus aggravating the condition.

Treatment.—No time should be lost, but a surgeon imme-

diately consulted, who can cure this most painful condition by simply stretching the anal orifice, the patient being under chloroform or ether. Palliative treatment is most disappointing. It consists in keeping the bowels relaxed, injecting warm oil every time the bowels are going to act, and smearing the surface of the sore with mercurial, boracic, or galls and opium ointment immediately afterwards, by gently inserting the finger.

Abscesses may form in the neighbourhood of the anus as the result of irritation from hard substances, such as fish-bones, in the motions, and frequently occur in tuberculous persons. The formation of an abscess is attended by the ordinary signs of inflammation, such as fever and throbbing pain. Unless treated by a surgeon, the abscess may burst either inside the bowel or by the side of the anus, and continue to discharge indefinitely through a small opening, constituting what is known as a '*fistula*.' A fistula causes aching discomfort in the bowel, discharge of pus with the motions, and occasional attacks of fever.

Treatment.—An abscess in connection with the bowel should not be poulticed and allowed to burst, as a fistula will almost certainly result. Abscesses in this situation often burrow for a considerable distance, and unless surgical aid is sought early, a severe operation may be necessary to effect a cure. In the absence of skilled help, if an abscess forms and bursts externally, the patient should be kept at rest in bed, fed on slop diet, and the opening should be dilated and kept open, and the abscess cavity syringed out daily with antiseptic solution. The opening may be kept from closing by occasionally inserting the point of a stick of lunar caustic, and then passing in a strip of lint to the extremity of the cavity by means of a probe. The object of the treatment is to keep the opening free, and to allow the free escape of the pus until the cavity has healed by granulations.

Prolapse of the rectum, which consists of a protrusion of the mucous membrane, and sometimes the muscular wall, of the bowel through the anus, is a common occurrence in debilitated children, and usually causes great alarm to the parents. It is most often due to irritation in the lower bowel from thread-worms, causing straining or diarrhoea. Occasionally it is due to difficulty or pain in passing water, from stone in the bladder.

The prolapsed bowel forms a round raw-looking tumour, with a central depression, which is the orifice of the canal.

Treatment.—Lay the child on its back and bathe the tumour with cold water. Get an assistant to steady the legs, and pass the little finger of the left hand into the central depression, and make pressure on the tumour with the fingers of the right hand. It is usually quite easy to reduce. Worms, and any other source of intestinal irritation, must be sought for and treated. The child should be kept in bed for a few days, and fed on slop diet. When the bowels are going to act, an ounce or two of cold water should be injected, and the child should be kept flat on its back, and the motion passed into a cloth or flat dish. Tonics of iron and sulphate of magnesia (to prevent constipation) are useful.

Stricture of the rectum may be due to contraction of the scars of old ulcers or the formation of tumours. The earliest symptom is usually slight *diarrhœa*, which persists in spite of careful diet and medicinal treatment. The conditions producing it require skilled treatment.

Itching of the anus is usually due to thread-worms in children. In adults, it may be caused by piles, fistula, lice, skin eruptions, or irritating articles of diet, such as highly spiced food, curry, or cayenne pepper.

Treatment.—The cause must be searched for and treated. Scrupulous cleanliness after the bowels have acted. The parts should be freely washed with soap and water, and bathed with boracic, weak Condyl, or carbolic lotion.

INTESTINAL WORMS

Worms obtain admission into the body by the eggs being swallowed in impure water, in raw or underdone meat, or on the leaves of uncooked vegetables, and on fruit contaminated by impure water.

Symptoms.—Pain or uneasiness in the abdomen, and irregularity of the bowels, constipation alternating with diarrhœa. The appetite is capricious, sometimes voracious, attended by more

or less marked anæmia and wasting. The sleep is often disturbed; grinding the teeth, nightmare, and incontinence of urine are common. Thread-worms usually cause intense itching of the nose and anus in children, especially at night. Severe nervous disturbance may occur, such as convulsions or epileptic fits.

The worms most commonly met with are:—

1. **Thread-worms.**—These haunt the cæcum and lower bowel, and may be recognised in the motions as fine, white, tapering threads, $\frac{1}{3}$ to $\frac{1}{2}$ inch in length.

Treatment.—The worms should be dislodged by an aperient, such as a teaspoonful of castor oil or a grain of grey powder, twice a week, and a salt and water enema ($\frac{1}{4}$ to $\frac{1}{2}$ pint) administered every night for a week. The anus should be sponged with weak carbolic lotion, and the child prevented from scratching himself by fastening the nightdress below the feet. The finger-nails must be cut short, and the hands kept clean.

2. **Round-worms** often produce no symptoms, and are not suspected until one is either vomited or passed in a motion. They are grey or pinkish in colour, and from six inches to a foot or more in length. They inhabit the small intestine, but sometimes wander into the stomach, and cause vomiting.

Treatment.—Clear out the bowels with castor oil, and give santonin, gr. $\frac{1}{2}$ to gr. 5, according to the patient's age, on two following nights, and another dose of castor oil the next morning. An iron tonic should be given afterwards. (See CAUTIONS IN ADMINISTERING DRUGS—SANTONIN.)

3. **Tape-worms.**—There are many varieties, some several yards in length. The head is very small and round, with a constricted neck joining it to a body which consists of a large number of flattened joints; these increase in size the farther they are away from the head. These joints tend to break off, and portions of the worm are found in the motions as flat, or twisted, jointed, white bands.

Treatment is most efficacious if the stomach and intestines are empty. Take a glass of milk instead of solid food over night, and the next morning wash out the intestine with a full dose of some saline aperient, such as Carlsbad salts, in a tumbler

of hot water. When the bowels have acted, take liquid extract of male fern, $\text{m}20$, in a teaspoonful of milk or starch mucilage, lie down, and repeat the dose twice, at intervals of an hour. Two tablespoonfuls of castor oil should be taken with the third dose. The head of the worm should be carefully sought for in the motions. If this has not come away the worm will re-develop.

CHAPTER V

DISEASES OF THE LIVER

Acute Inflammation and Abscesses—Congestion—Chronic Inflammation, Cirrhosis—Lardaceous Liver—Jaundice, obstructive and non-obstructive—Gallstones and Biliary Colic—Dropsy.

THERE is no organ of the body popularly supposed to be so liable to derangement as the liver. In reality, few organs stand more abuse without complaining. The majority of minor ailments are attributed to a 'sluggish liver,' and a more or less inappropriate pill is promptly consumed. It would be far more correct in most cases to use the adjective 'over-worked' instead of 'sluggish,' and to substitute exercise, and a diet free from excess of fat and alcohol, for the usual mercurial pill. It is well to emphasise here that slothful habits, an excessive consumption of food, especially fatty food, and the abuse of alcohol, are the common causes of a disordered liver, and if these habits are corrected the symptoms will probably disappear without medicinal treatment.

Inflammation of the liver.—1. *Acute inflammation* rarely occurs unless accompanied by the formation of an *abscess*, due to tropical dysentery or pyæmia. The symptoms are rigors and fever, intense pain, tenderness, difficulty in breathing, and frequently jaundice.

Treatment consists in the evacuation of the abscess by a surgeon if the seat can be discovered. Palliative treatment consists in leeches, or active counter-irritation, and hot fomentations over the liver. Saline aperients, and food consisting of meat juices, skimmed milk, and lemonade.

2. *Congestion* may be caused (1) by obstruction to the flow of blood, in diseases of the heart and lungs; (2) by want of exercise, over-eating, abuse of alcohol, and constipation; (3) by

chill, prolonged residence in tropical climates, or by the poisons of ague, Malta fever, dysentery, typhoid, and pyæmia. The symptoms, in cases uncomplicated by other diseases, are—dull aching pain, often referred to the right shoulder-blade, or between the shoulders, tenderness over the liver, difficulty in breathing, and jaundice in severe cases; the tongue is coated, the appetite bad or absent; the bowels are irregular, often diarrhœa, with the passage of bile in large quantities; there is nausea, and sometimes vomiting; the urine is scanty and high-coloured, and becomes thick on standing. Dropsy of the abdomen often occurs in cases due to chronic diseases of the heart or lungs.

Treatment.—If there is constipation, calomel, gr. 2, compound rhubarb pill, gr. 10, colocynth and hyoscyamus pill, gr. 5, or compound decoction of aloes, §1, should be given at night, followed by a saline aperient in the morning. A saline aperient may be given every morning. The diet should consist of plain food and small quantities of lean meat; fat, butter, pastry, and alcohol being avoided. Milk may be taken in small quantities; skimmed milk is better. (See GOUT.) A mixture containing tincture of nux vomica, nitro-hydrochloric acid, and gentian should be taken after food. Loss of blood from piles, or nose-bleeding, is often followed by relief of the symptoms.

3. *Chronic inflammation, cirrhosis*—*i.e.* hardening of the liver—is the result, or an exaggerated form, of chronic congestion, and may arise from similar causes. The habitual abuse of alcohol is a common cause. The liver is at first enlarged and hardened, obstructing the flow of blood from the stomach and intestines; this is followed in most cases by contraction of the fibrous tissue, marked diminution in the bulk of the organ, and aggravation of the symptoms. The onset is insidious, and the earlier symptoms are those of indigestion, and congestion of the liver. Retching or vomiting, and absence of appetite in the morning, are very common; the bowels are irregular, piles are frequently complained of. Later, when contraction of the liver takes place, the vomiting and diarrhœa become more severe. Blood is often vomited, altered by digestion, looking like coffee-grounds mixed with mucus, and bleeding occurs from the nose and bowels. Piles sometimes bleed profusely, and give temporary relief.

Nervous symptoms: tremor of the tongue, lips, and hands, mental irritability and depression, and restlessness, particularly at night, are common. Owing to the profound disturbance of the digestion, emaciation of the limbs occurs, and, at the same time, the abdomen may become distended from dropsy. Jaundice may occur, but is usually not severe.

Treatment.—This disease is easy to prevent in most cases, but impossible to cure when once the condition is fully established. The habit of taking stimulants between meals should never be acquired. When the early symptoms are noticed, the use of alcohol should be abandoned altogether, and the dyspepsia treated on the lines indicated for congestion of the liver. If these warnings are not taken, and contraction of the organ occurs, life may be prolonged by temperance and careful diet, but health cannot be restored. For diet, see GOUT.

Lardaceous disease. — Persons suffering from prolonged suppuration, due to diseased bones, joints, or consumption, often become anæmic, and the liver and kidneys become affected. The liver slowly enlarges, and may attain an enormous size, distending the upper part of the abdomen and the lower part of the chest. It is quite painless. There is usually digestive disturbance, such as vomiting and diarrhœa, with progressive weakness and emaciation. The quantity of urine passed is increased.

Treatment.—Treat the cause of the suppuration; when this ceases, improvement follows immediately. The condition is often met with in children with tuberculous joints; amputation of the diseased limb is often followed by the most remarkably rapid recovery.

Jaundice is a symptom accompanying many diseases, and is not a disease in itself. The various forms of jaundice are divided into two important classes.

1. *Obstructive jaundice* is due to obstruction of the bile ducts. This may be caused by a gall-stone, or by swelling of the mucous membrane of the ducts, or of the intestine where the main duct empties itself, with the result that, though the bile is secreted by the liver, it cannot flow away. *Catarrhal jaundice* is the commonest form, and the symptoms and

treatment are here given. It may be due to cold, an attack of acute indigestion, or irritation from a gall-stone, causing swelling of the mucous membrane. There may be fever, due to the chill, or vomiting, from irritation of the stomach, and often great depression of spirits. Often nothing is noticed before the skin and whites of the eyes become slightly yellow. The discoloration may increase to a deep orange or golden colour. There is usually flatulence and indigestion; the motions are white or clay-coloured, from the absence of bile in the intestine, and the urine is turbid, and deep saffron or red in colour. The patient is languid, with a slow pulse, and a loathing for food. There may be intense itching of the skin.

Treatment.—The diet should at first consist of meat broths, free from fat, skimmed milk, and soda-water. Two grains of calomel may be given, followed by salines, but purging should be avoided. When the motions become yellow again, showing that bile is entering the intestine, the treatment should be conducted on the lines laid down for congestion of the liver. During convalescence the appetite is often voracious, and some discretion must be exercised. The urine usually continues bile-stained for a considerable time after the motions have become natural.

2. *Non-obstructive jaundice* occurs in yellow fever, malaria, typhoid, septicæmia, and pyæmia; in cirrhosis of the liver; in poisoning by mercury, phosphorus, and snake-bites. The discoloration is usually due to destruction of the red blood-corpuscles, and staining of the tissues with the pigment set free. In some cases there is actual destruction of the liver tissues; this is a very fatal condition, known as malignant jaundice. Excessive secretion of bile, and re-absorption by the intestine, may be the cause in mild cases. In these conditions the discoloration of the skin is usually not very marked, only amounting to a light lemon tint as a rule; the motions are yellow or brown, and the urine, though high-coloured, is not turbid from the presence of bile. Severe nervous symptoms, such as coma or convulsions, are common.

The treatment must be selected according to the disease which causes the jaundice. Its occurrence in these conditions is always a grave symptom.

Gall-stones occur more often in women than in men. Their formation is favoured by sedentary habits, over-eating, starchy food, pregnancy, and tight lacing. They originate in the small ducts, and may lodge in the gall-bladder, or pass into the intestine. Their passage may give rise to intense pain, known as *biliary colic*. The attack comes on suddenly, with fever, and agonising pain over the gall-bladder and stomach, shooting up into the right breast and shoulder. There may be vomiting, profuse sweating, and shock. Jaundice often develops, and may be intense, but is by no means constant. Gall-stones may also cause inflammation of the gall-bladder and be discharged into the bowel by ulcerating through into the neighbouring intestine. They are usually passed with the motions, but a collection of stones or a large one may cause intestinal obstruction. In some cases an abscess forms around the gall-bladder, and discharges through the abdominal wall.

Treatment.—During an attack of colic a mustard-leaf and hot fomentations should be applied to the abdomen, or a hot bath taken. Laudanum, $\text{m}20$, must be given to relieve the pain. Severe cases may require subcutaneous injections of morphia, or the administration of chloroform by a physician. Their formation should be guarded against by exercise, and the avoidance of excess of starchy food, sugar, and alcohol. A saline aperient, containing sulphate of soda, such as the artificial Carlsbad salts, should be taken daily, in the early morning.

Dropsy — œdema — anasarca. — Dropsy is a condition produced by many diseases, and must be regarded as a symptom, and treated according to the cause. (See CONDITIONS PRODUCED BY DISEASE—DROPSY.)

Dropsy of the face is an early symptom in inflammation of the kidneys; the eyelids become swollen, and the whole face looks white and puffy. The same appearance may be produced by anæmia, but not to such a marked degree. Inflammation of the eyelids, stings and bites of insects, a suppurating wound on the forehead, and erysipelas, also cause marked swelling of the face. The swelling due to mumps is peculiar to that disease. A decayed tooth causes swelling, usually on one side. Lardaceous disease, lymphadenoma, and myxœdema, cause chronic swelling of the face. Poisons from unwholesome food, mush-

rooms, shellfish, tinned meat, may cause acute swelling, or nettle-rash of the face.

Dropsy of the abdomen, or ascites, may be due to disease of the liver, chronic disease of the heart and lungs, advanced kidney disease, or chronic peritonitis. When the patient is lying on his back, the abdomen looks broad from bulging of the flanks; the skin is often marked by enlarged veins. The abdomen may also be distended from accumulations of fat, tumours, flatulence, and pregnancy. Anaemia is often accompanied by flatulent distension, which, with other symptoms, may give rise to unfounded suspicions when the sufferer is a young woman.

Dropsy of the lower limbs.—The feet and legs are often the seat of swelling, owing to the circulation having to overcome the force of gravity. It occurs in most debilitated conditions if the patient walks or stands much; when the patient is in bed, it may be the first sign noticed of the heart beginning to fail. Dropsy of the legs may be detected by making steady pressure with the finger over the shin-bone near the ankle. On removing the finger, a depression is left, which persists for some seconds; this is commonly described as a part ‘pitting’ on pressure. It occurs early in inflammatory diseases of the kidney, though rather later than the swelling of the eyelids, and is usually more or less present when there is dropsy of the abdomen. It may also be caused by tight garters, varicose veins, and acute inflammation of the veins and lymphatics. See ‘WHITE-LEG.’ Pressure on the veins at the groin, or in the pelvis, may cause oedema, usually of one limb only.

CHAPTER VI

DISEASES OF THE KIDNEYS AND URINARY ORGANS

Congestion of the Kidney—Acute Inflammation, Acute Nephritis—Chronic Bright's Disease, 'Fatty,' 'Waxy,' 'Gouty' Kidney—Abscess of the Kidney—'Gravel,' Renal Colic, Stone—Inflammation of the Bladder, Cystitis—Difficulty in Passing Water, Retention—Suppression—Incontinence of Urine, 'Bed-wetting'—Diabetes.

ALTERATIONS in the urine, such as increase or diminution in the quantity passed, alterations in the colour, increased frequency in the calls to pass water, pain in the loins, and dropsy, are the common symptoms which draw attention to disorders of these organs.

Congestion of the kidney accompanies most acute febrile conditions, severe chills, and chronic disease of the heart and lungs. The symptoms are usually masked by those of the disease causing it, but the urine is usually scanty and high coloured, and deposits lithates on standing. Albumen may be detected by chemical examination.

Treatment.—Treat the accompanying disease. The diet of fever; fluids; guard against chills, especially during convalescence.

Acute inflammation, acute nephritis, acute Bright's disease, or acute albuminuria is an intense form of the condition above mentioned, and is particularly common after scarlet fever and during pregnancy. The onset is often sudden. Chills or rigors, fever, pains in the loins, headache, and vomiting. The face is pale, and the eyelids become swollen, followed by dropsy of the feet, the genital organs, and the body generally. The desire to pass water is frequent, but only a little is passed at a time, and the total quantity is greatly diminished. There may be complete suppression. The urine is high coloured, and looks

murky or smoky, from the presence of blood mixed with it. Large quantities of albumen are usually present. Sleeplessness and severe headache are unfavourable symptoms, and may precede convulsions and coma.

Treatment.—Bed, flannel nightdress. Promote the action of the skin by diaphoretics, but do not use Dover's powder. Diuretics are useless. The bowels should be kept freely open by occasional doses of jalap and saline aperients. Mustard-leaves, and poultices or hot fomentations, frequently renewed, should be applied to the loins. Hot packs, to promote sweating, are invaluable. Bromide of potassium may be given to relieve the headache, and for sleeplessness. Opium in every form must be avoided. The diet should consist of milk, diluted with soda or lime water. Lemonade and barley water may be freely taken. Meat broths and juices are best avoided. The disease is a serious one, and calls for skilled treatment. Prolonged care is necessary after convalescence.

Chronic Bright's disease is met with in two distinct forms.

1. *Fatty kidney* is usually a sequel to acute nephritis, but often comes on insidiously after scarlet fever or diphtheria which has run a mild course. The earliest symptoms noticed are usually anæmia, and swelling of the face and feet. The quantity of urine is diminished, and it often looks clear and healthy, though it may become turbid from blood at times. There is usually progressive weakness, with disorders of the digestion. Dropsy may become very marked.

Treatment.—Improve the general health. Warm clothing. Saline aperients and tonics of iron and nux vomica. Bismuth may be necessary to subdue irritation of the stomach and intestines. Milk should be the staple article of diet; eggs and fish may be taken, butcher's meat is best avoided.

'*Waxy*' or *lardaceous* kidney, due to chronic suppuration, produces a condition somewhat similar to the above, but the urine is increased in quantity, and the dropsy is only slightly marked.

Treatment (see LARDACEOUS LIVER).

2. *Gouty kidney*.—Contracting granular or cirrhotic kidney is a disease of middle or advanced life, usually attacking males. It is often hereditary in gouty families, but may arise from high

living with alcoholic excess, chronic disease of the heart and urinary bladder, and from chronic lead poisoning. It usually comes on insidiously. The patient may look healthy or full-blooded, but is often short of breath, and suffers from nose-bleeding. If the patient is alcoholic, liver trouble may mask the symptoms due to the kidneys. The urine is increased in quantity at first, the patient often having to get up at night to pass water, and looks clear at times, contains lithates at others. The disease may last many years, but as it progresses vomiting and diarrhœa are common, and nervous symptoms, such as sleeplessness, headache, convulsions, or coma may occur. The arteries become affected, and bleeding from the nose, in the eye, or in the brain, causing apoplexy and paralysis, are common. Diminution in the quantity of urine passed, and the occurrence of dropsy, are grave signs of progressive heart failure.

Treatment.—The disease is incurable. For palliative treatment, see GOUT. Bleeding from the nose and from internal piles usually gives temporary relief, and should not be too speedily arrested.

Abscesses of the kidney may be due to irritation from gravel or a stone, tuberculosis, chronic disease of the urinary bladder with decomposition of the urine, and operations on the bladder.

Symptoms.—Rigors and sweats, pains in the loins, tenderness on pressing the affected side, and intermittent discharge of pus in the urine. The urine looks turbid when passed, and the pus is deposited as a white sediment at the bottom of the containing vessel on standing.

Treatment.—Counter-irritation or cupping the loins. Hot hip-baths, milk diet, with soda-water and citrate of potash.

‘Gravel.’ Renal colic. Stone in the bladder.—‘Gravel’ is the popular name for the presence of urates or uric acid crystals in the urine (see METHODS OF OBSERVING AND INVESTIGATING DISEASE—URINE). They may arise from errors in diet and indigestion, and occur in gout and rheumatism. Oxalate of lime is another form of crystal which is frequently present, but not often noticed, as it is colourless; indigestion, acid wines, and cooked rhubarb, may produce it.

These crystals are formed in the kidneys, and may cause stone in the kidney ; they may pass down the ureter and if large cause attacks of intense pain, called 'renal colic'; they may lodge in the bladder, and cause stone of the bladder ; in the majority of cases they are discharged painlessly in the urine. Many people pass gravel for years without any discomfort, but others suffer from aching pain in the loins, and occasional passage of blood in the urine, usually after violent exercise or some jolting movement. The urine may be simply smoky, or bright red from blood. '*Renal colic*' is an attack of agonising pain, starting in the loin and abdomen, and shooting down into the thigh and testicle on the same side. There may be a rigor and sweating, high fever, nausea and vomiting, and collapse. Urine is passed frequently in small quantities, usually blood-stained. *Stone in the bladder* is common in the children of the poor, and in middle-aged and old persons of the wealthier classes, in this country. It is far more common in males than females. The symptoms are frequent desire to pass water, particularly during the day ; pain towards the end of the act, often felt at the end of the penis, and lasting for some time afterwards ; occasional sudden stoppage of the stream, due to the stone blocking the orifice ; and the passage of blood. All the symptoms are aggravated by active exercise, and diminish when the body is at rest in bed. Children often assume strange attitudes whilst passing water, and this may be the first symptom noticed ; they are usually disinclined to play ; sometimes suffer from prolapse of the bowel, due to straining ; and often scream after passing water.

Treatment.—When a person passes gravel he should diet himself, and take the general hygienic measures as recommended for GOUT. Citrate or bicarbonate of potash may be taken largely diluted with water on an empty stomach.

During an attack of renal colic the patient should be placed in a bath, as hot as it can be borne, and given plenty of hot fluid, lemonade or barley water, to drink. In the absence of a bath, mustard poultices and hot fomentations should be applied. The administration of opium or chloroform may be necessary, but is very unsafe in unskilled hands. There is no treatment for stone in the bladder of the smallest size, except operation.

Inflammation of the bladder.—Cystitis may be either acute or chronic. Acute inflammation may arise from swallowing poisons, such as turpentine or cantharides, from cold, by the extension of disease from the kidney or urethra, or by irritation from stone. A chronic inflammation may become acute.

Symptoms.—Frequent and uncontrollable desire to pass water, with straining, and without relief. Fever, sickness, and pain over the bladder. The urine is high coloured, often offensive and stained with blood.

Chronic cystitis commonly arises from long-continued obstruction to the flow of urine, from the irritation of a stone, or follows an acute attack. There is frequency in passing water; the desire comes on suddenly, and is controlled with difficulty. The urine is high-coloured, contains mucus, and often smells of ammonia.

Treatment.—In acute cases. Hot hip-baths, or fomentations to the lower part of the abdomen. A suppository, containing opium, morphia, or belladonna should be inserted into the bowel. Saline aperients. Fluid diet, milk and soda-water, lemonade or barley water in large quantities. In chronic cystitis, a surgeon should be consulted, and the cause treated. The patient should learn how to wash out his bladder. The diet should consist of milk, eggs, farinaceous puddings, fish and poultry; beef, salt food, spices, coffee, and alcohol must be avoided. If the urine is offensive, salicylate of soda, gr. 10, may be taken three times a day before food; if the urine is acid, citrate of potash, ʒi, or bicarbonate of soda, gr. 20, twice a day before food. Medicinal treatment is futile unless the cause is treated at the same time. The patient should lead a quiet life, and avoid exposure to cold and violent exertion.

Difficulty in passing water, retention, and suppression of urine.—Difficulty in passing water may occur suddenly, but far more often it is preceded by symptoms pointing to some affection of the urinary organs. Calls to pass water more frequently than usual, particularly when occurring at night, show that there is something wrong, and advice should be sought. It is far more common in men than in women. It is most frequently due to stricture of the urethra, or, in men of advanced

age, to enlargement of a glandular organ (prostate gland) situated at the base of the bladder, or the two conditions may exist together. In stricture of the urethra, after a period of increased frequency, often without other symptoms, difficulty begins to be experienced, and increases, and the urine is voided in a fine squirting stream, which is often twisted or forked. In old men there is straining and difficulty in commencing to pass water, and the urine comes away in a stream of fair size, but with a feeble flow. Both conditions, if neglected, lead to chronic inflammation of the bladder, followed by dilation, so that the organ never completely empties itself. Complete retention may occur, or the bladder may become gradually distended to the utmost, and the urine then begin to overflow and dribble away, but without relief. An over-distended bladder is often mistaken for inability to hold water—a very grave error, as over-distension leads to kidney disease, or the urine may penetrate and become extravasated into the surrounding tissues. Retention of urine may also be caused by not relieving the bladder for many hours, which often happens to coachmen; by acute inflammation of the urethra, or the impaction of a stone. It may occur in unconscious or paralysed patients, or after an injury or operation. In children, it is usually due to a tight and inflamed foreskin, or to stone. In women, to pressure from tumours, pregnancy, or hysteria.

Suppression of urine is the absence of secretion, which occurs in acute inflammation of the kidney, intestinal obstruction, and severe shock.

Treatment.—The early signs of stricture and disease of the bladder should be taken as warnings, and the advice of a surgeon sought before the disease has advanced. If retention occurs and skilled help is unobtainable, the patient should be placed in a hot bath, and a purge given. If this is not successful, a catheter should be passed. (See CATHETER, METHOD OF PASSING.) It is useless to give diuretics, and gin and all forms of stimulants should be avoided. The food should be limited to milk and barley-water. Bromide of potassium may be given in full doses, and a belladonna suppository inserted into the bowel. Unconscious patients must be carefully watched, and the bladder relieved regularly by the use of a catheter. A hot bath and rest, with the foot of the bed raised on blocks, are usually

successful in women. Hysterical girls usually pass water unaided if no notice is taken of their complaints. In suppression of urine, the disease causing it should be treated.

Incontinence of urine in the aged or diseased is often due to an over-distended bladder, which in these cases may be felt as an oval tumour in the lower part of the abdomen.

Treatment.—The bladder must be relieved by a catheter. In middle age, it may arise from stricture of the urethra, cystitis, stone, the irritation of piles, gout, disease of the kidneys and diabetes. The cause must be treated.

Bed-wetting in children may be due to irritation of the genitals, stone, thread-worms, indigestion, or general debility. It is occasionally due to paralysis of the bladder.

Treatment.—Careful search should be made for any source of irritation, and the cause treated. If the urine is acid, and gravel is passed, the child should be dieted (see INDIGESTION IN CHILDREN.) The last meal should be taken with only a limited quantity of fluid (2 oz.). The child should be aroused and made to pass water when the parents retire to rest. It should be prevented from sleeping on its back by threading an empty reel of cotton with tape, and attaching it to the back of the night-dress over the loins. The bed-covering should be light. Iron is beneficial in many cases. Boys often require circumcising, and should at the same time be examined for stone. Punishing the child is useless cruelty.

Diabetes—sugar in the urine.—Diabetes is a disease occurring both in children and adults, characterised by the passage of large quantities of urine containing sugar, distressing thirst, voracious appetite, and wasting. The causation is obscure; it is variously attributed to disorders of the nervous system, the liver, and the pancreas. It may follow mental strain and acute fevers, or occur during pregnancy. The urine is clear and almost colourless; the quantity passed in the twenty-four hours varies from six to eight pints in mild cases, or as much as thirty pints in severe cases. The onset is insidious; increasing thirst, frequency in the calls to pass water, and irritation of the skin around the urinary orifices, are usually the first symptoms noticed. The tongue becomes dry and raw looking.

the hair harsh and scanty, and the skin rough and dry. In spite of the voracious appetite, emaciation is usually rapid. The formation of boils and carbuncles is common, and gangrene may occur. In a certain number of cases, cataract forms and the sight fails. Pneumonia and coma are common terminations. The younger the patient, the more serious is the prospect. The urine of gouty men of middle age often contains sugar in small quantities, unaccompanied by thirst or wasting. This condition is called 'glycosuria,' and usually disappears when the patient is dieted. Nervous people often pass enormous quantities of pale urine, and this may be continued for years without any alteration in the general health. The urine contains no sugar, and hence the condition is called 'diabetes insipidus.'

Treatment.—General hygiene and diet are most important. The patient should lead a quiet life, and the action of the skin be encouraged by friction and woollen clothing. The diet must consist of food as free as possible from every form of starch and sugar; even milk must be taken sparingly. This must be rigidly adhered to. The deprivation from bread is a severe trial after a short time, and its substitutes are unpalatable and expensive. Thin bread thoroughly toasted may be taken by people who cannot afford almond and gluten cakes. Glycerine and saccharin may be used for sweetening purposes. The diet should be commenced gradually and the prohibited articles cut off by degrees.

DIET FOR DIABETES

May be taken	Taken sparingly	Avoided
Meat, fish, poultry, game of all sorts. Clear soups. Eggs, cream, cheese, butter. Gluten and almond cakes. Lettuce, spinach, cress.	Milk. Toast. Cauliflower, cabbage, Brussels sprouts, radishes. Grapes, nuts.	Liver, oysters, crabs, lobsters. Thick soups, bread, sugar, cornflour, rice, tapioca, arrowroot, sago, macaroni, ver- micelli, pastry. Potatoes, beetroot, arti- chokes, peas, beans, vegetable marrow, asparagus.
Oranges, lemons. Tea, coffee, cocoa-nibs. Aërated waters.	Whisky, dry wines.	Beer, champagne, sweet drinks.

There is nothing to be gained by diminishing the amount of fluid taken, and thirst may be freely gratified by plain water or

any form of fluid which contains no sugar. If the diet is relaxed, and starch or sugar taken, the thirst is aggravated immediately, and the quantity of urine increases. The medicinal treatment consists in the administration of opium and its various preparations. Opium is usually well borne by diabetic patients, but its use involves the exercise of great judgment and care, and skilled advice should always be sought. Glycosuria must be treated on the lines laid down for gout. Diabetes insipidus usually accompanies other nervous symptoms, and does not require special treatment. Bromide of potassium is useful.

Note.—Diabetes is not a disease of the urinary organs. It should more properly be classed with gout; but the prominent symptom, increase in quantity of urine, makes it a more practical arrangement to include it in this chapter.

CHAPTER VII

DISEASES OF THE EYE

Injuries: Contusions and Wounds; Foreign Bodies; Burns and Scalds—
Diseases of the Lids: Inflammation; Styas; Inversion of Eyelashes—
Diseases of Conjunctiva: Ophthalmia, Catarrhal, Chronic, Purulent—
Diseases of Cornea and Iris: Keratitis; Ulcers; Iritis—Cataract—Glaucoma
—Squinting—Defective Sight: Long-sight; Short-sight; Astigmatism; Old-
Sight—Disorders of Vision: Spots, *Muscæ volitantes*; ‘Night-blindness’;
‘Tobacco-blindness’; ‘Colour-blindness.’

DOMESTIC practice must be confined to the treatment of inflammation of the lids and of the lining membranes of the eye (conjunctiva). Some diseases of other parts of the eye are here noticed in order that they may be recognised, and assistance sought at the proper time. Inflammations arising in one part very often extend to neighbouring structures. Thus, inflammation of the conjunctiva may induce a similar condition in the cornea, leading to the formation of ulcers and iritis. Care has been exercised in selecting treatment which can be carried out with safety. Solutions of *atropine*, so invaluable in the treatment of diseases of the eye in skilled hands, are quite unsuitable for domestic use. There are certain conditions, such as iritis and glaucoma, which often closely resemble one another; *atropine* is almost indispensable in the treatment of the one, destructive if used for the other. When lotions or other remedies are directed to be applied to the conjunctiva or cornea, it is useless simply to bathe the surface of the lids, which are quite watertight when the eye is closed. The lids must be forcibly opened, and the remedy introduced either by means of a camel-hair brush, or allowed to trickle in from a pledget of soaked wool or rag, the head being thrown well back. Two persons are usually needed to apply remedies to the eyes of a young child. They should sit opposite each other, and the child be laid on its back on their laps; the one who applies the remedies should hold the head gently between her knees, leaving

her hands free, whilst the other grasps the child's hands and controls the legs. In order to apply a lotion to the inner surface of the upper lid, the trick of everting the lid should, if possible, be acquired, which is the only really effectual method. As an alternative, the lotion may be introduced into the eye and the lid moved repeatedly up and down, so as to get well under the inner surface. It is well to note that cold applications, if regularly applied, usually give great relief in the early stages of acute inflammatory affections of the eye; but if the condition does not yield to cold, hot applications should be substituted. There is one marked exception—*i.e.*, *iritis*, *unless due to injury*, *should always be treated by heat*. In chronic affections of the eyes, confinement to the house should as far as possible be avoided. Even when one eye only is affected, *both* eyes should be shaded, because the two eyes are intimately associated, and every stimulation to the one is communicated indirectly to the other.

INJURIES

Wounds and contusions.—The eyeball is so protected by the bony margins of the orbit and the nose that it is rarely injured by a blow from any large object. The bones receive the force of the blow, and the blood extravasates into the loose tissues of the lids, causing a 'black eye.' The eyeball itself may be damaged if the injury is sufficient to break the bones, or by small objects, such as a knuckle, a racquet ball, or the end of a stick. Under these circumstances, the eyeball may be so severely concussed as to shake important structures, the iris or lens, from their attachments, and permanent impairment of the sight result, or the eyeball may be actually ruptured. The lids are often wounded, and the eyeball is sometimes cut by thorns, pieces of glass, and various sharp objects. There is great danger to the sight if the wound is near the margin of the iris, *i.e.*, at the junction of the coloured part with the white. Superficial wounds or abrasions are common occurrences, from the scratch of a finger-nail, or minute fragments of metal or stone flying from tools. 'Foreign bodies,' such as dust, sand, flies, and cinder, cause great suffering if they happen to lie under the lids. They often stick to the under surface of the upper lid, where they are difficult to find and remove unless the lid is everted.

Treatment.—The eye should be protected from the light, and cold applications used for all forms of injury.

Black eye.—Apply cold immediately. A thin pad of three layers of lint or linen may be firmly bandaged on to exert pressure, and kept constantly wet with evaporating spirit lotion dripped on to the bandage. Refrain from blowing the nose.

Contused eyeball.—Shade both eyes and keep the patient at rest. Use evaporating lotion or ice. Lead lotion must not be used if there is a wound. Give a brisk aperient.

Cuts of the lids require treatment on ordinary lines.

Wounds and rupture of the eyeball are serious injuries, which require immediate and skilled treatment—the sight of both eyes may be lost. When surgical help cannot be obtained, place the patient in a dark cool room, and keep him at rest. Bathe the eye with cold boracic lotion, or water which has been boiled. Then cover the eye with a thin layer of clean dressing, and keep it constantly wet with boracic lotion or boiled water, if possible iced. If there is discharge, the dressing must be changed frequently. Keep the bowels relaxed. Apply mustard-leaves or leeches to the temples. The two eyes should be kept shaded, and not used for any purpose until skilled advice has been obtained. No feeling of false security should allow these directions to be relaxed. Some of the gravest injuries are unattended by pain, and may appear quite trivial to the uninitiated.

Foreign bodies must be searched for in a good light. A strand of horse-hair doubled and knotted so as to form a loop is useful to extract small particles of grit or cinder. Seat the patient in a chair and stand behind him so that his head rests against your chest. Place the hair-loop within reach, and gently pull down the lower lid and make the patient look up. If the foreign body cannot be seen, it is probably under the upper lid, which must be everted. To do this, take a fine round instrument, such as a probe or knitting needle (in the right hand if the right eye is affected, and *vice versâ*), and lay it horizontally along the crease of the lid which is made by the folding of the skin when the eye is open. Tell the patient to look down without moving his head, and seize the lashes of the upper lid between the left forefinger and thumb. Then pull

the lid gently and steadily, first away from the eyeball, and then upwards, at the same time making gentle downward pressure with the probe or needle. If this is done skilfully, the red conjunctiva projects and the foreign body can readily be seen and removed. It is an extremely simple thing to do, and unattended by the possibility of any mishap or evil consequence. If a foreign body is embedded in the cornea, and cannot be removed by means of the horse-hair loop, a drop of castor oil should be inserted into the eye, which should then be bandaged, and skilled help sought. When a person is alone, he may endeavour to get an irritating substance out of his eye by one of the following methods:—Exciting a free secretion of tears by pungent odours, such as ammonia or that of an onion; pulling the upper lid well down over the lashes of the lower lid, and at the same time forcibly blowing the nose; putting the face in a basin of water, and repeatedly opening and shutting the eyes; gently stroking the upper lid downwards, from the outer or temple side towards the nose. Indiscriminate rubbing the eye should in all cases be abstained from, as the foreign body is simply made to rasp the eye, and the irritation is increased.

Burns, scalds, and irritation by caustics.—These accidents require prompt treatment. For the irritation caused by—

(1) Lime, potash or soda. Wash out the eye with vinegar, two tablespoonfuls, to water, half-a-pint.

(2) Acids. Wash out the eye with common soda, one teaspoonful, to water, half-a-pint.

(3) Burns and scalds. Drop castor oil or olive oil into the eye. Castor oil used twice daily is good routine treatment in all these forms of injury. An endeavour should be made to prevent inflammation by cold lotions, and leeches or mustard-leaves to the temples. When inflammation occurs, hot applications should be substituted for cold. These injuries are often followed by severe ulceration of the cornea and lids.

DISEASES OF THE LIDS

Inflammation of the lids (tinea tarsi).—Common in children; often the result of measles.

Symptoms.—Soreness and redness of the edges of the lids,

with the formation of crusts, and glueing together of the lashes. Ulcers and pustules may form, leading to destruction of the lashes and permanent baldness of the lids.

Treatment.—Iron tonics and fresh air. Remove the scabs by fomentations of boracic lotion applied for quarter of an hour night and morning. After each fomentation paint the edges of the lids with nitrate of mercury ointment.

Styes.—A sty is an inflammation near the edge of the lid, commonly in connection with one of the lashes. They occur in anæmic people with digestive disturbance, particularly after measles. A succession of them is common.

Treatment.—Hot boracic fomentations. If an eyelash is seen situated in the centre of a sty it should be pulled out. When a white head forms it should be pricked with a clean needle. Saline aperients. Quinine and iron tonics.

Inversion of the eyelashes is usually the result of chronic inflammation of the lids and spasm of the muscle which closes the eye. The condition produces much irritation and constant blinking.

Treatment.—Pull out the lashes which rest against the eye. Use an astringent lotion—alum, gr. 5, to water, 1 oz. The condition is often extremely intractable, and requires an operation. Relief may in some cases be obtained when the lower lashes are at fault by gently pulling down the lower lid and keeping the lashes away, and the lid on the stretch, by the pressure of the finger against the margin of the orbit. If perseveringly practised the spasm may be greatly diminished.

DISEASES OF THE CONJUNCTIVA

Inflammation of the conjunctiva is called **conjunctivitis** or **ophthalmia**. There are several varieties, all more or less capable of being communicated from one person to another. It is of the utmost importance in schools that each child should have its own towel, that ‘jack-towels’ for common use should be as far as possible abandoned, or at any rate frequently changed, and strict rules should be enforced against their being used to dry the face. Children who develop ophthalmia should be

separated from the healthy, and it is preferable that they should wash themselves with water running from a tap over a sink, and should avoid the use of basins. The towels of these children should be sent to a different laundry, or disinfected before being washed. Sponges must not be used to bathe the eyes; absorbent wool, lint, or clean linen rag, are to be used for this purpose, and then immediately burnt. The same piece must not be used twice.

1. **Catarrhal conjunctivitis**, "cold in the eye," may be caused by draughts, foul air, dust, or may accompany or follow measles. The lids are somewhat swollen, and the white of the eye becomes reddened from dilatation of the vessels. The redness is most marked near the lids, and fades towards the cornea.

Symptoms.—The lids feel hot and heavy; there is a sensation of grit in the eyes, with more or less watering. A strong, especially an artificial, light causes annoyance. There is a sticky secretion, which gums the eyelids together; this is very troublesome on awaking in the morning. In mild cases there may be but little secretion, and the lashes do not become glued together.

Treatment.—Shade the eyes and protect from draught, but do not bandage. Smear the lashes with boracic ointment to prevent them from sticking together. Apply cold to the lids. If the inflammation persists, warm fomentations had better be used, and alum or boracic lotion used, either painted with a camel-hair brush or dropped into the eye.

2. **Chronic conjunctivitis** often supervenes on the above condition, and is common in strumous children. There are several varieties. The eyes are usually red, the lids sore; there is watery discharge and intolerance of light. The formation of ulcers is common. In some cases the inner surface of the lid becomes studded with a number of rounded, pale bodies like little grains of boiled sago. This condition is termed 'granular lids.'

Treatment.—Iron tonics, nourishing food, fresh air and exercise. The eyes should be shaded, but not covered up, and the child kept out of doors as much as possible. Strong astringents are often necessary, such as nitrate of silver,

gr. 5–20, to water 1 oz., but they must only be used under medical superintendence. Alum and boracic lotion may be used with some prospect of success, but the treatment, even in skilled hands, is always a tedious process, and sometimes a question of years.

3. **Purulent ophthalmia** is a very grave affection, entailing serious risk to the sight. It is an acute inflammation, attended with the discharge of pus, the result of infection by certain microbes.

It may occur in young infants, and is then almost invariably noticed on the third day after birth. It may be caused by contamination of the eyes by discharges from other parts of the body. It is very prevalent in Egypt, the poison being conveyed by dust and flies.

Symptoms.—About forty-eight hours after infection there is itching and redness of the eye, with turbid discharge. Swelling rapidly sets in, with great pain, and the discharge becomes profuse, thick, and yellow. The lids become greatly swollen, the upper hanging down over the lower, and often so stiff that it is difficult to lift it and examine the eye. The disease may be limited to one eye; more often one is attacked first and the other becomes infected subsequently.

Treatment.—The most essential part of the treatment consists in the frequent removal of the discharge, and preventing the lids from sticking together. ‘Every hour, day and night, the lids are gently opened and the discharge removed with soft bits of moistened rag or cotton-wool; or a syringe or irrigation apparatus may be used.’ The edges of the lids should be smeared with nitrate of mercury or boracic ointment. Boracic lotion may be used to wash the eye with for the first two days, and subsequently alum and boracic lotion. Pain may be relieved in adults by hot fomentations, and leeches or mustard-leaves applied to the temples. The sound eye should be protected by sticking a watch-glass over it with plaster. Cold applications may be used with advantage if these can be attended to with unvarying regularity, but they are harmful if only half-done. In infants, counter-irritation is not advisable, but the removal of the discharge by bathing every hour must not be neglected. Stronger applications than the above, such

as solutions of nitrate of silver, cannot be used safely by unskilled persons. Even mild remedies cause much suffering if properly carried out, and an adult patient will probably pray to be let alone. His entreaties must be disregarded if the eye is to be saved. A severe attack usually lasts from four to six weeks. This affection is extremely contagious, and every precaution must be taken by the attendants on the sick lest they inoculate their own eyes.

DISEASES OF THE CORNEA AND IRIS

Inflammation of these structures may be caused by injury, acute fevers, such as measles, may accompany chronic conjunctivitis, particularly in strumous children, or be due to rheumatism and other constitutional diseases.

Inflammation of the cornea (keratitis).—There is usually some conjunctivitis present, and the eye waters, and looks red and inflamed. The blood-vessels of the white of the eye are enlarged, especially those immediately surrounding the cornea. There is pain and intolerance of light. The cornea loses its transparency and becomes hazy, or as it is commonly described, ‘steamy,’ or like ground glass. In severe and chronic cases it becomes an orange or dull red colour, due to the formation of blood-vessels which do not normally exist in the cornea.

Ulcers may form either just outside or within the margin of the cornea. They take the form of a raised grey or yellow spot, and usually shift their position, travelling along the surface towards the centre of the cornea, a trail of minute red blood-vessels following in the track. When an ulcer is present, the intolerance of light is usually so intense that it is difficult to examine the eye. They are common in children, and when told to face the light a child holds its head down, and the eyes blink, and the tears run down the cheeks. There is usually great pain in and around the eye.

Treatment.—The general health must be attended to, both eyes shaded, and the patient live out of doors as much as possible. Frequently bathing the eyes with cold water is useful.

In some cases warm fomentations seem to give greater relief, and boracic lotion may be used. In chronic cases, when both eyes are affected, but without the formation of ulcers, which is a common form in children between the ages of six and fifteen years, small doses of grey powder, gr. $\frac{1}{3}$ – $\frac{1}{2}$, should be given three times a day, under medical supervision. When ulcers are present, yellow oxide of mercury ointment should be put inside the eyelids once or twice a day, a small piece about the size of a hemp-seed, with a camel-hair brush. It usually causes smarting, and after an interval of half an hour the eyes may be washed out with warm water. As an alternative to the ointment, finely powdered calomel may be used on alternate days, a little of the powder being dusted in with a dry camel-hair brush. Atropine drops, used in proper cases, often give great relief, and blisters on the temples may be used if the pain is severe. When an ulcer has healed, the scar forms a white spot on the cornea, which may become permanent and seriously impair the sight.

Inflammation of the iris.—Iritis often accompanies ulcers of the cornea, and is frequently due to injury, rheumatism, and other constitutional diseases.

Symptoms vary: some cases, in which the eye looks very inflamed, are attended with but little pain; others, in which the signs of inflammation are only slight, as is often the case in rheumatism, are accompanied by severe neuralgic pain in the eye, brow, and temple. As a rule, there is a zone of congestion around the cornea, which looks ‘steamy,’ and the colour of the iris is changed when compared with its fellow. This change of colour is most marked in a blue or grey iris, which becomes greenish; a brown iris may look rather yellow. On shading the eye from the light, the pupil either does not dilate at all, or very slowly, and it often assumes an irregular shape, from its margin adhering to the lens behind. There is usually pain, watering of the eye, intolerance of light, and defective vision.

Treatment.—Iritis requires skilled advice, for both the local and constitutional symptoms. Rheumatic iritis runs a very chronic course, often relapses, and may lead to permanent derangement of the eye; fortunately, only one eye is commonly attacked. Rest in a dark room, leeches to the temples, the

constant application of heat, and atropine drops, are usually required. The bowels should be kept freely open, and alcohol avoided. Prolonged rest may be necessary, and the eye protected from cold with a pad of wool, for a considerable time after the eye is apparently well.

CATARACT

Cataract means opacity in the lens due to alteration in its structure. The condition requires skilled treatment, and is only mentioned in order to warn sufferers that no possible benefit can be derived from the medicines and external applications so largely advertised by quacks. Children are occasionally born with cataract, but the majority of cases are due either to injury or advancing years.

GLAUCOMA

Glaucoma is a disease in which the eyeball becomes hard and distended, from an excessive quantity of fluid within it. It may follow an injury, or acute inflammation in the eye, or occur, for no apparent reason, in people past middle age. The incautious use of atropine drops may lead to the condition.

Symptoms.—The onset in most cases is insidious. Usually, after prolonged use of the eyes, the sight is noticed to be cloudy, and artificial lights are seen surrounded by ‘halos’ or ‘rainbows.’ After a time, attacks of pain in the eye, brow, and temple occur, the eye becomes congested, and the sight is more continuously impaired. The pupil is usually large, and the iris sluggish in its movements. When the signs of inflammation are marked, and the cornea ‘steamy,’ particularly when these conditions occur suddenly, the disease may be mistaken for iritis, and if atropine drops are used all the symptoms are greatly aggravated.

Treatment.—The early recognition of the disease is all-important; operation is usually required to save the sight. Domestic treatment is futile.

SQUINTING (STRABISMUS)

Squinting may be a symptom of brain or nerve disease, or may follow injuries to the head. It is very common in children, and in them it is usually due to defective vision. It is most

often noticed after some illness, when the general strength is enfeebled. It may be constant, or only noticed when the child is tired. 'Long-sight,' which necessitates considerable exertion of the muscles of the eye to focus the sight, when looking at near objects, is the common cause. With improvement of the general health the squint may disappear, but by far the larger number of cases require proper glasses, which must be worn constantly for all near work, such as reading or writing. If the condition is neglected, the sight of the squinting eye gradually fails, and though the faulty position of the eye may be corrected by operation, the sight may continue to be impaired. This may lead to the rejection of a boy who is anxious to enter the army or navy.

DEFECTIVE SIGHT

The common cause of defective sight is alteration in the shape of the globe of the eye, so that the rays of light are not focussed correctly on the retina, and a blurred image results. In some cases the defect can be compensated for by unconscious muscular effort, but if the muscles of the eyeball become enfeebled from any cause, the sight is defective, or a squint may result. (See SQUINTING.)

'Long-sight' (hypermetropia), the commonest defect, is due to the eyeball being too short from front to back.

Symptoms.—Often none, unless the health suffers in some way; more commonly the eyes ache or water, or 'things become dim,' after a prolonged spell of near work, reading or sewing. It is a common cause of headaches, watering and blinking of the eyes, and squinting in children.

Treatment.—Convex spectacles; attention to the general health.

'Short-sight' (myopia) is due to the eyeball being too long.

Symptoms.—Distant objects appear blurred. 'Screwing up' the eyes, frowning, aching of the eyeballs, headache, and squinting.

Treatment.—Children should be prevented from stooping

over their books, and should not be allowed to read in a bad light. Concave glasses are required for distant vision, and children who are very near-sighted should use them for reading and writing.

‘**Astigmatism**’ is due to the normal curves of the surfaces of the cornea or lens being irregular. Ulcers of the cornea are a common cause of severe forms of this condition.

Symptoms may resemble those of either ‘long’ or ‘short’ sight, but they are far more difficult to relieve with glasses, and require the most skilled examination.

‘**Old-sight**’ (**presbyopia**), sometimes called ‘long-sight,’ is due to the lens becoming less elastic during advancing age. The facility for seeing things quite close begins to diminish from quite an early age (about the tenth year), but the failure is usually not very noticeable until about the fiftieth year. From then onwards books have to be held further away from the eyes, and in a good light, in order that they may be read with comfort.

Treatment.—Convex glasses for near work, which should always be done in a good light. Supposing that a person has previously had good sight, and has been neither near nor long sighted, the following table shows the glasses which will probably suit. The numbers are those in general use by English spectacle makers; the letter D is usually appended, which is the abbreviation of the word *dioptre*, which is the unit of the scale.

Age 50 years, requires 2·0 D convex glass.					
„	55	„	„	3·0 D	„ „
„	60	„	„	4·0 D	„ „
„	65	„	„	4·5 D	„ „
„	70	„	„	5·5 D	„ „
„	75	„	„	6·0 D	„ „

The selection of proper glasses for persons suffering from hypermetropia, myopia, and astigmatism requires long practice and considerable judgment. The common practice of going to an optician’s shop, and trying several pairs of spectacles, until a pair is found which is said ‘to suit,’ is much to be condemned.

Spectacles selected in this way are usually far too strong, and extremely likely to injure the sight. It is impossible for anyone to recommend correct glasses unless he can make a skilled examination of the eyes with the aid of an ophthalmoscope. The use of this instrument requires considerable practice, and the art is soon lost, unless in frequent requisition.

DISORDERS OF VISION

Floating spots.—*Musæ volitantes* are small dots, rings, or threads seen before the eyes, particularly when looking at white surfaces, rising or falling, according to the motion of the eyes, but never crossing the centre of vision. They are commonly attributed to biliousness, and may be present in various dyspeptic conditions, but they more often accompany short-sight than any other condition. Except for the annoyance they cause they are wholly unimportant. The less notice taken of them the better, as the habit of looking at white objects for the purpose of detecting their presence aggravates the condition. Indigestion or anæmia may require treatment.

Night blindness is due to exhaustion of the retina from prolonged exposure to a bright sun. It is common in the tropics, particularly if exposure to the sun is accompanied by bad food and fatigue. The same condition may be caused by the glare from snow-covered ground ('snow-blindness'), or of an electric light.

Treatment.—Smoke-coloured glasses should be worn during the exposure to light. Cod-liver oil or other fatty substances, if the patient has been badly fed.

Tobacco-blindness occurs in men who persistently smoke large quantities of tobacco. The strong varieties of tobacco, such as shag, appear to be particularly injurious, especially if smoked indoors by men leading sedentary lives. The sight is dim, particularly in a bright light, and there is some colour-blindness with regard to green and red. There is usually headache, loss of appetite, nervousness, and some tremor of the hands. Alcoholic excess may help to produce the condition.

Treatment.—All remedies are useless if the patient persists

in smoking; if he abandons the habit, no medicine is needed. *Nux vomica* is usually given.

Colour-blindness is usually only partial; the most common form is for green to be confused with red and grey. Blue and yellow can usually be distinguished. The condition is often congenital, or may accompany other grave disorders of the sight. Boys intending to serve in the army or navy should have their sight tested early, before they begin their special education, as this defect will lead to their rejection if detected.

Colour vision should be tested by giving the patient a bundle of skeins of wool of various colours and shades, and telling him to sort them out. When he has finished, the reds, greys, and greens will be found mixed if he is colour-blind. The condition is incurable.

CHAPTER VIII

DISEASES OF THE EAR

Symptoms : Deafness ; Noises in the Ears ; Earache ; 'Running' or Discharge
—Diseases of the External Ear : Wounds and Contusions ; Skin Affections
—Diseases of the Auditory Canal : Foreign Bodies ; Flies and Insects ;
Wax ; Boils ; Diffuse Inflammation.—Diseases of the Middle Ear or Drum :
Ruptured Drum ; Acute Inflammation and Discharge ; Chronic Inflammation and Discharge ; Chronic Inflammation without Discharge ; 'Throat-Deafness'—Diseases of the Internal Ear : 'Menière's Disease.'

THE treatment of diseases of the ear is, to a great extent, preventive. Many grave affections arise from the rough way in which children's ears are handled, both by themselves and others who should know better. Boxing and pulling the ears, as a form of punishment, once so prevalent, is now happily but rarely practised. Unintentional injury is often done by cleaning the ears with some hard instrument, such as the rounded end of a hairpin, scantily padded by one thickness of a handkerchief, or endeavours to remove wax or foreign bodies with a bodkin. Earache or discharge from the ear should always receive careful attention ; it is too often regarded as quite a normal or trivial event during teething, or after measles, but the condition so lightly described as 'a little running from the ears,' if neglected, may lead to fatal inflammation of the brain. The ear is a difficult organ for the unskilled to examine under all circumstances, and the complex internal ear is almost an impenetrable region, even to the specialist. There are certain aids to ascertaining what part of the ear is affected, which should be generally known.

When there is earache, (1) if pressure just behind the joint of the lower jaw in front of the ear causes pain, the inflammation is seated in the external tube. (2) Pressure made in the depression immediately under the lobe of the ear, and causing pain, indicates inflammation of the middle ear. (3) Pressure

on the bone behind the ear, causing pain, means disease of the bone, and the contained air-cells, which is a grave condition. (4) If a person is deaf, and cannot hear a watch ticking, which he holds between his teeth, at the same time closing his ears with the fingers, the nerve of the ear is at fault, and he will derive no benefit from any form of trumpet, artificial ear-drum, electric battery, or other quack instrument or treatment. In the majority of cases this condition is hopelessly incurable.

When there is earache or discharge from the ear, accompanied by pain, forcible syringing should be avoided. Under these circumstances, lotions should be allowed to trickle into the ear from soaked pledgets of wool, the patient lying on his side. In syringing, in order to straighten the canal, the ear should be grasped by the upper margin, and gently drawn upwards, and slightly backwards. The stream should be directed, not directly into the canal, but slightly upwards against the upper wall. After syringing, the canal should be thoroughly dried by inserting a pledget of cotton wool, withdrawing it, and re-inserting a fresh piece; at least three pieces being used. Finally, a dry pledget is inserted, and left there for some hours, according to the quantity and nature of the discharge. When the discharge is profuse, and particularly if it is offensive, the wool should be changed every hour.

SYMPTOMS OF DISEASE

Deafness.—Impairment of hearing may be due to (1) blocking of the auditory canal by wax or a foreign body; (2) disease of the apparatus, situated in the middle ear, which conducts the vibrations of sound; (3) disease of the nerve which receives and conducts the impressions to the brain; (4) to defect in the brain itself. Before attempting to aid the hearing by mechanical means, such as artificial ear-drums, ear-tubes, or trumpets, the cause of the deafness must first be ascertained. In the following pages the more common affections of the external and middle ear are described, with their treatment. Deafness due to diseases of the internal ear, *i.e.* nerve deafness, continues to baffle the efforts of the medical profession, and is not benefited by the ear-tubes and electric treatment of quacks.

Artificial ear-drums are only of use to a very limited number of cases of middle-ear disease, and the best form can be made by the patient himself out of a piece of cotton-wool.

Noises in the ears (tinnitus).—These may be due to (1) debilitated conditions of the health, such as anaemia, or great loss of blood; (2) blocking of the auditory canal by wax, wool, &c.; (3) inflammatory affections of the middle ear; (4) affections of the nerves; and (5) certain drugs, such as quinine and salicylate of soda. (See THROAT-DEAFNESS.)

Earache.—Pain in the ear is a common symptom in many conditions; the cause must be sought for in order to treat it successfully. It may be due to—

(1) Facial neuralgia, from decayed teeth, ulceration of the tongue, or some similar cause, the pain being referred, and the ear itself quite healthy. In this condition there is an absence of tenderness, or other sign of inflammation, about the ear, and the cause of the neuralgia must be treated. A piece of mustard-leaf placed in front of the ear often gives relief.

(2) Mumps. The swelling of the face is characteristic, and the disease must be treated.

(3) Foreign bodies, wounds, and inflammations of the external auditory canal. The orifice of the canal is usually inflamed and swollen, and there is tenderness in front of the ear. There is often discharge present.

(4) Disease of the middle ear. The patient is often a teething infant, or suffering from cold in the head, sore throat, measles, or scarlet fever, or has had discharge from the ear continuously or occasionally for many years. The pain is usually worse at night. There is tenderness below or behind the ear, often fever, and ringing noises in the ear, without any obvious sign of disease on looking at the orifice of the ear.

(5) Disease of the bones enclosing the ear, or inflammation of the brain and its membranes. There is often severe constitutional disturbance and offensive discharge.

‘Running’ or discharge from the ear.—This may be due to inflammatory affections of the external auditory canal, of the middle ear, or of the surrounding bones. These are common

in infants during teething, or may arise from colds in the head, measles, or scarlet fever. Discharge from the ears is a common symptom in strumous children and those who suffer from polypi and enlarged tonsils; it may be thin and watery, turbid, or blood-stained. It is often offensive.

Bleeding or blood-stained discharge may be due to (1) fracture of the base of the skull; (2) rupture of the membrane of the drum; (3) polypi of the ear passages; (4) disease of the bones.

Profuse watery discharge sometimes succeeds bleeding from the ear from fracture of the base of the skull.

Treatment.—Bleeding from the ears is only a symptom, and the cause must be searched for and treated. When the bleeding is due to injury, the patient must be kept at rest, the bowels freely opened, and stimulants withheld. The ear must be carefully cleansed, but not syringed. Astringent injections (styptics) must on no account be used, except under medical direction. (See DISEASES OF AUDITORY CANAL AND MIDDLE EAR.)

DISEASES OF THE EXTERNAL EAR (AURICLE)

Wounds and contusions.—The ear is often lacerated by blows or falls on the side of the head. The tissues of this part possess great vitality, and often recover when apparently hopelessly damaged. The ear should be cleansed, and the lacerated edges brought as correctly together as possible by numerous narrow strips of plaster. Suturing the ear is a delicate operation, as the needle must be passed just through the skin, which is very thin, and not through the whole thickness of the ear, which contains cartilage. An ear almost torn off from the head will often unite, and leave but little deformity. A common result of injury to boxers and Rugby football-players is the formation of a dark purple swelling on the outer surface of the ear, which is called a '*Hæmatoma auris*.' They occasionally form from no apparent cause. The swelling is a collection of extravasated blood between the skin and the ear cartilage. They should be treated by the application of cold evaporating lotion. They must not be pricked. After they have subsided, some thickening of the tissues and deformity is often left.

Their presence should not be neglected, and rough games should be discontinued until the swelling and discoloration have disappeared. If a hæmatoma is subjected to further violence, it is liable to inflame and suppurate, and leave most unsightly puckering of the ear.

Skin affections.—*Eczema*, and the formation of crusts, *impetigo*, are common in children, and these conditions must not be neglected, as they are so often the starting-point of chronic inflammation in the lymphatic glands of the neck.

Treatment.—Remove the crusts by bread poultices, or, preferably, warm fomentations of lead, boracic, or alkaline lotion; then apply an ointment, either boracic or nitrate of mercury and zinc ointment, mixed in equal parts. The child's general health usually requires attention; iron tonics and animal diet may be needed.

'*Black-heads*' (*acne punctata*) often form in the auricle. These should be squeezed out, and attention paid to cleanliness.

'*Chalk-stones*' (*tophi*) may form irregular concretions in the upper edge of the ear. (See GOUT.)

Chilblains may occur in the ears. They are usually present in the feet at the same time. (See CHILBLAINS.)

AFFECTIONS OF THE EXTERNAL AUDITORY CANAL

Foreign bodies are often inserted by children, and may cause irritation, discharge, and impairment of hearing. It is important that they should be promptly removed, especially when the body is a pea or a bean, which germinate and swell from the warmth and moisture of the ear.

Treatment.—No attempt should be made to remove them by any rigid instrument, such as a hairpin. It is often a temptation to do this when the object can be seen easily, but if attempted, the child almost invariably moves its head, and the object is pushed further in. Syringing the ear is the only safe way to remove them, and if this fails, a surgeon should at once be consulted. It is often necessary to administer chloroform. When a syringe is not at hand, and the foreign body lies immediately at the orifice of the canal, it is sometimes possible,

in a tractable child, to pass a loop of horse-hair by the side of the object, and then work it round so as to pull it out.

Flies and insects sometimes get into the canal, and cause intolerable annoyance by buzzing and tickling. A few drops of warm sweet oil should be poured into the ear, which soon suffocates the insect. It may be removed subsequently by syringing.

Wax, and pledgets of cotton-wool which have been inserted and forgotten, often cause partial deafness. When a person has accumulations of wax, causing deafness, his own voice usually sounds very loud to him, and he hears cracking noises when eating. Accumulations of wax may be due to cold in the head, but are more often caused by too vigorous efforts to cleanse the ears, and the wax being forced back. The instruments sold for cleansing the ears, consisting of a bone shaft, with a scoop at one end and a small sponge at the other, are abominations, which should never be used. Nothing smaller than the finger, covered with a soft towel, should ever be used to clean the ears.

Treatment.—Pour a few drops of glycerine, mixed with twice the quantity of warm water, into the ear overnight, and insert cotton-wool. On the following morning syringe the ear with warm water, when the wax will probably come away in the form of a long dark plug. The ear must then be dried, and cotton-wool kept in it for the remainder of the day. If the water returns as clear as it went in, there is probably no collection of wax present, and it is useless to persevere with the syringe. The deafness is probably due to some other cause, and advice should be sought.

Boils often form in the canal, and give rise to severe throbbing pain, which may radiate over the side of the face and head. Pressure in front of the ear causes great pain. The boil may often be seen, almost blocking the opening of the ear, and may cause deafness.

Treatment.—A few drops of warm lead and opium lotion, or laudanum and glycerine in equal parts, on cotton-wool, should be placed in the ear. A piece of mustard plaster, the size of a

sixpence in front, and hot fomentations covering the ear and side of the head.

Inflammation of the canal may involve the whole of the lining membrane; caused by foreign bodies or rough handling, and very often from water getting into the ears when bathing. It is common in gouty adults and teething infants, and may take the form of eczema. There is burning or throbbing pain, the orifice looks red and contracted from the swelling, and after some hours there is discharge, which may be either thin and watery, or turbid and thick.

Treatment.—Similar to that for boils; when the discharge is present, and the pain subsides, the ear should be gently syringed with warm boracic lotion, and cotton-wool pledgets inserted, and frequently changed. As the discharge diminishes, minute white flakes are often washed out; the interior of the canal may now be painted, after syringing, with nitrate of mercury and zinc ointment in equal parts, *warmed*, and applied with a camel-hair brush.

DISEASES OF THE DRUM OR MIDDLE EAR

Rupture of the drum is not nearly so common an accident as is popularly supposed. It is occasionally injured by sharp instruments being thrust into the ear, or it may be torn across when the base of the skull is fractured. Explosions and blows on the ear rarely burst the drum, but cause deafness by the shock which is inflicted on the whole auditory apparatus. It is frequently perforated by the discharges which accompany acute inflammation of the middle ear.

Symptoms.—Rupture of the drum from injury causes acute pain, deafness, which as a rule is only temporary, and usually free bleeding from the ear.

Treatment.—Keep the patient at rest, give a purgative, and apply a blister in front and below the ear. The orifice of the ear may be gently cleansed with wool soaked in boracic lotion, but it must not be syringed. The wool must be frequently changed. Do not give stimulants.

Acute inflammation or catarrh may exist in a more or less severe degree in various conditions. It usually accompanies

all inflammatory conditions of the nose and throat, the inflammation extending along the eustachian tube to the middle ear. In slight ailments, such as cold in the head, the lining membrane may be simply congested, and only dulness of hearing and some ringing in the ear be noticed. In acute fevers, such as measles or scarlet fever, the inflammation may be intense, and suppuration occur.

Symptoms.—Severe throbbing pain, deafness, ringing noises in the ear. Acute tenderness on making pressure under the lobe of the ear. Fever. There is no swelling or redness to be seen on looking at the orifice of the ear. When discharge occurs from the ear, the pain usually subsides.

Treatment.—The condition requires skilled treatment, both for the relief of pain and prevention of chronic disease. In these cases the popular remedies for earache, such as inserting a piece of hot onion, or dropping solutions of ammonia, spirit, or hot oil into the ear, are all injurious. Active counter-irritation should be used, in the form of leeches or pieces of mustard-leaf, applied in front of, under the lobe, and behind the ear, and hot fomentations to the side of the head and face. A brisk aperient should be given, and fluid food; alcoholic drinks should be avoided. If the throat is inflamed, this must be treated by sucking ice or by sprays. (See DISEASES OF THE THROAT.) The patient will probably have obtained medical advice before discharge from the ear occurs, but if this has not been obtainable, and pus is noticed, the ear must be kept scrupulously clean, syringed out twice daily with boracic lotion, and pledgets of wool, frequently changed, placed in the ear to absorb the discharge and exclude the air. This treatment must not be relaxed until all discharge has ceased.

Chronic inflammation with discharge is usually the sequence of one of the above conditions. The patient is usually anæmic, suffers from enlarged glands, tonsils, or adenoid growths, or has other symptoms of ill-health, and is more or less deaf. The discharge often ceases from time to time, but attacks of earache are common after some cold or fatigue, followed by recurrence of the discharge. The pus is often offensive, and may be blood-stained; this is an almost certain indication of the bone being diseased. There may be acute

tenderness behind the ear, and swelling in this region, due to the formation of an abscess. If unrelieved, the most acute suffering may continue until the abscess bursts. Abscess of the brain may result if the condition is neglected.

Treatment.—Chronic discharge from the ear is such a grave affection that many insurance companies reject applicants who suffer from it. Skilled advice is of the utmost importance. The nose and throat often require treatment as a preliminary, and operation may be necessary, both for the relief of these conditions and the removal of diseased bone. The greatest care must be exercised in keeping the ear clean, by the use of antiseptic injections and the frequent changing of wool placed in the ear to absorb the discharge. The general health must be treated; prolonged residence by the sea is sometimes necessary. (See TUBERCULOSIS.)

Chronic inflammation without discharge, or ‘chronic dry catarrh,’ is the most common cause of deafness. It is sometimes called ‘Throat-deafness,’ owing to some affection of the nose and throat being almost invariably present. It is often hereditary, and attacks several members of one family.

Symptoms.—In many cases the disease commences in childhood; the patient often suffers from repeated colds in the head, from enlarged tonsils, or symptoms of nasal obstruction. (See ENLARGED TONSILS AND ADENOID GROWTHS). There is deafness, which varies from time to time, but is worse during a cold in the head, and in damp cold weather. There is usually no pain, though there may be occasional attacks of earache. Unless treated, the impairment of hearing becomes greater and more constant, and is accompanied by noises in the ears. The disease may begin in adult life, and singing noises in the ears are then usually noticed before the deafness, which, however, gradually increases. The patient often finds that he hears better when travelling in a carriage or train, but the deafness returns when the carriage stops and the vibrations cease. An adult will sometimes find his hearing improve during the running stage of a cold in the head.

Treatment.—Enlarged tonsils, repeated colds in the head, and ‘mouth-breathing’ should never be neglected in children. Persons who are members of a family in which deafness is

common, must guard their ears against cold, and should place cotton-wool in them when bathing, and thoroughly dry them afterwards. Woollen clothing and warm foot-covering are very important. After the throat condition has been treated, it is usually necessary to have the child examined from time to time by a surgeon for any blocking of the eustachian tube, which must be kept open.

Chronic dry catarrh in an adult is usually progressive and incurable, and an ear trumpet must be used. The minute ear tubes which fit the orifice of the ear, and are so largely advertised, are always useless, and often harmful.

DISEASES OF THE INTERNAL EAR

These are most often the result of some inherited or constitutional disease. Deafness, ringing in the ears, giddiness, and nausea are the common symptoms. The affections are usually painless, and present no external manifestation of disease, though they may follow chronic affections of the middle ear. For the most part they are incurable. They are mentioned principally for the purpose of warning people that when they have been pronounced incurable by a skilled surgeon it is useless to seek the aid of a quack, who is always ignorant or dishonest.

There is one affection which may arise in otherwise healthy people, '*Menière's disease*,' which is characterised by sudden attacks of giddiness, nausea, and faintness, with deafness and ringing in the ears. The attacks tend to recur, and the deafness and tinnitus to increase and become constant.

Treatment.—The bowels should be regulated, and a quiet life led. Quinine, bromide of potassium, and salicylate of soda, are sometimes of use in shortening the attacks and diminishing their frequency. When one drug fails, the others should be tried. Small doses are usually ineffectual.

CHAPTER IX

DISEASES OF THE SKIN, HAIR AND NAILS

Eczema—Ringworm—Erythema—Pimples—Vesicles—Pustules—Scales or Seurf—Cracks or Fissures—Ulcers—Spots without elevation of the Skin Surface—Discolorations—Moles, Warts, and Corns—Baldness—Onychia—Ingrowing Nail—Exostosis under the Nail—Care of the Nails.

DISEASES OF THE SKIN

THE skin is affected in so many conditions that a general knowledge of the body, both in health and disease, is necessary in order to recognise and treat any particular form. The terms ‘spots,’ an ‘eruption,’ or a ‘rash’ are popularly used to describe every variety of skin affection. In attempting to give a definite description of the various conditions certain terms must be used, and should be clearly understood.

Spots = small discolorations of the skin without elevation of its surface, *e.g.* freckles.

Blotches = discoloration of larger areas, often produced by spots extending into one another.

Blush or *erythema* = redness of the skin disappearing for a moment after pressure.

Pimples or *papules* = small elevations of the skin not exceeding the size of a split pea.

Nodules = elevations larger than papules.

Vesicles = minute blisters containing clear fluid.

Blebs = large blisters.

Pustules = small or large blisters containing pus.

Wheals = flat elevations.

Scales = the dry upper layers of the skin partially shed.

Crusts = irregular dried masses of exudation.

Excoriations = raw skin surfaces due to the separation of the upper layers. (See ECZEMA, SCABIES.)

It is always important to note the appearance of an eruption as it first develops, and any subsequent changes. Some eruptions rapidly change their character: eczema, for instance, may begin in the form of a blush, and then papules, vesicles, pustules, and crusts succeed one another.

In the following brief description of the more common varieties of skin disease the affections are grouped together according to their most characteristic appearance. Eczema and ringworm are separately dealt with on account of their many varieties. In treating affections of the skin the general health should always receive attention, and it is unnecessary to repeat this at the end of every description.

The stings and bites of insects and animal parasites which affect the skin are described in Part V., Chapter VI. (See *ITCH* or *SCABIES*, *HARVEST BUG*, *LICE*, &c.)

Under the heading of each disease the affections which somewhat resemble and may be mistaken for the condition are enumerated in brackets.

Eczema is an inflammation of the vascular layers of the skin, with increased secretion of fluid and separation of the upper horny layers, or 'scarf-skin,' attended with more or less marked swelling and itching.

The symptoms vary according to the intensity and extent of the inflammation. Minute spots or large areas may be affected. The secreted fluid may form vesicles, pustules, or crusts, may be so profuse as to cause what is known as 'weeping eczema,' or so scanty that the separated skin forms dry scales.

Causation.—1. *Internal.* Indigestion, gout, nervous conditions, gastro-intestinal disturbance during teething, and rickets. (2) *External.* Irritation from sun, cold, wind, and wet. Strong soaps, chemicals. Handling irritating powders.

Symptoms.—1. *Acute eczema.* Burning and itching. Redness in minute spots, extensive blushes, or papules. Vesicles form, which burst and weep, forming yellowish crusts if undisturbed, excoriated surfaces if scratched. The vesicles may become pustules, and dark-green crusts may form.

Acute eczema on the face may be mistaken for erysipelas. Extensive blushes are common, and there is marked swelling, sometimes closing the eyes. The surface becomes scaly, but does not usually weep.

2. Chronic eczema. Skin thickened, irritable, reddened in irregular patches, and the surface scaly but without crusts.

In *young children*, eczema is common on the face and scalp, and is often acute with the formation of crusts. Pustules and superficial abscesses are common.

In *the aged*, eczema is often widely spread about the body, usually chronic and scaly.

Treatment.—Search for and treat any constitutional disorders. Diet as for gout and the dyspeptic conditions of childhood.

1. Acute eczema. Saline aperients and alkalis. *Locally*: Avoid plain water and soaps. Allay inflammation with alkaline, lead, or boracic lotion. Protect from the air. When the discharge is profuse, soften and remove crusts with olive oil, poultices, or boracic lotion, and dust the surface with boracic, zinc, and starch powder. When the discharge is moderate, use boracic and zinc ointment, mixed in equal parts.

2. Chronic eczema. Tonics. Coal-tar soap. Boracic and zinc ointment, or salicylic acid, gr. 5, to lanoline, 1 oz.

Ringworm is a highly contagious affection due to the growth of a minute fungus in the interior of the roots of the hairs. The symptoms vary very much, according to the region of the body attacked.

(1) *Ringworm of the scalp (tinea tonsurans)* is a disease of childhood. It starts as a red patch round a hair, and spreads, forming a circular greyish red patch covered with fine scales, rarely larger than a florin. Several patches may meet, and running into one another form scaly areas with irregular curved margins. The hairs become brittle and break off near the roots, making the patches appear bald, but the stumps can be seen on close inspection. In fair children the hairs, instead of breaking off, may become twisted and matted together. Pustules and crusts may form.

Treatment.—The child is usually in feeble health, and tonics and nourishing food are very important. The disease is often most intractable. Much time will be saved if the whole of the hair is cut as closely as possible, and kept short until the disease is cured. Wash the head with soft-soap and water every three days, and thoroughly rub in nitrate of mercury ointment every night and morning on each spot; or salicylic acid, 31, to collodion,

§1, may be painted on daily for one week, and the crust picked off at the end of a week ; the process being repeated for a fortnight. Careful search must be frequently made for fresh spots, and any twisted stumps of hairs must be pulled out with forceps.

The affection often persists for months. Until all scaliness has gone and there are no stumps to be found the disease must be regarded as being still present. When for any reason the hair has not been cut, it should be combed with carbolic oil. A brush must on no account be used. Hats and caps that have been worn must be relined. If the child cannot be isolated from the others, a light cap relined daily with tissue paper must be worn constantly. The other children should have their heads washed with carbolic soap three times a week, and be kept under constant observation.

(2) *Ringworm of the body (tinea circinata)* begins as a circular red, raised spot, which becomes scaly and spreads in the form of a ring.

Treatment.—Wash with soft soap. Paint with tincture of iodine, or salicylic acid and collodion, or rub in nitrate of mercury ointment.

(3) *Ringworm of the beard (sycosis)* begins as a red, scaly spot, which enlarges. Pustules around the hairs are common. There may be crusts with surrounding inflammation.

Treatment.—Cut the beard short, and perseveringly pick out the affected and surrounding hairs ; rub in nitrate of mercury ointment. Shave if the inflammation permits, using carbolic soap. The razor or brush of another person must not be used.

A. Erythema.—Redness of the skin in blotches or forming a blush. (See BURNS AND SCALDS, CHILBLAINS, SCARLET FEVER, GERMAN MEASLES, ERYSIPELAS.)

1. In infants and fat people, usually due to two skin surfaces chafing together. Often on the buttocks of infants, caused by dirty napkins and irritation from the urine.

Treatment.—Cleanliness and keeping the skin dry. Dust with boracic, zinc, and starch powder ; or apply boracic ointment on lint. Lead lotion in severe cases until the inflammation subsides.

2. *Nettle-rash (urticaria).*—Intense itching and tingling, erythema, followed by the formation of white wheals. Occasion-

ally no wheals form, and the condition may be mistaken for scarlet fever. Due to irritation of the stomach or intestine. Food, such as shell-fish, mushrooms, pork, canned meat. Sometimes noticed after the administration of an enema for constipation. Medicines: copaiba, quinine, belladonna, turpentine. Worms; chronic diarrhoea; gout; particularly in children. Chills after exercise.

Treatment.—Saline aperients, such as a seidlitz powder; an emetic in severe cases. Warm bath. Sponging with vinegar and water. Quinine or salicylate of soda in chronic cases.

3. *Erythema nodosum.*—Red painful nodules, usually on the shins of both legs, with fever and aching pains. Usually in young adults who suffer from rheumatism.

Treatment.—Rest in bed, and milk diet. Belladonna and glycerine paint, hot fomentations. Salicylate of soda till pain is diminished, then iron. (See RHEUMATISM, LUPUS, ACNE, ROSEOLA.)

B. Pimples or papules (see SCARLET FEVER, MEASLES, VACCINATION, CHICKEN-POX, SMALL-POX, TYPHOID FEVER, MALIGNANT PUSTULE, GLANDERS).

1. *Lichen.*—Small red pimples, itching, tingling, or burning; scales or crusts may form.

There are numerous varieties, some attended with fever.

(1) ‘Red-gum’ in infants who are teething or suffering from disorders of the intestine; common in hot weather.

Treatment.—Warm bath, boracic and zinc powder; fluid magnesia, diet.

(2) ‘Prickly heat’ of tropical climates, often attended by the formation of vesicles.

Treatment.—Rest, simple diet, saline aperients; the surface of the body must be kept covered. Alkaline lotion. Warm baths. Boracic and zinc powder.

2. *Prurigo.*—Crops of pimples of the same colour as the skin, usually in patches; intolerable itching; tendency to scratch rarely controlled, and excoriations result.

General health usually impaired; often follows jaundice.

Treatment.—Nourishing food. Iron tonics. Alkaline lotions, carbolic soap, or menthol liniment painted on.

3. *Acne.*—(1) *Acne punctata.* Hard pimples with a black

dot at the top ('black-heads'), common in young adults on the face, shoulders, and chest. The pimples may inflame, and form purple nodules or pustules. The skin is usually greasy. Scars are often left.

Treatment.—Exercise, simple diet, aperient iron tonics, hot baths, and friction of the skin. The black heads must be squeezed out. If the pimples are inflamed, alkaline and boracic lotions.

(2) *Acne rosacea*. Flushed face and pimples. The tissues of the cheeks, nose and chin become thickened. Usually due to indigestion, often caused by tight-lacing and intemperance.

Treatment.—Regulate the diet, avoid alcohol and coffee. Treat constipation and indigestion. Sulphur ointment. Lead or zinc lotion.

C. Vesicles or minute blisters.—(See CHICKEN-POX, VACCINATION, SMALL-POX, ACUTE FEVERS ATTENDED WITH PROFUSE PERSPIRATION, MALIGNANT PUSTULE, GLANDERS, SCABIES.)

1. *Shingles or herpes*.—(See NEURALGIA.)

2. *Sweat rashes or sudamina*, due to profuse perspirations which attend such illnesses as rheumatic and typhoid fever. (See RED-GUM and PRICKLY HEAT, and their treatment.)

3. *Impetigo contagiosa*.—Vesicles in clusters round the mouth, nose, ears, or neck, becoming pustules, and then drying and forming a yellow or brown scab. Infection probably conveyed by contact. Outbreaks occur amongst boys playing Rugby football. Common amongst the children of the poor.

Treatment.—Soften the scabs with olive oil, warm fomentations or poultices, and remove them. Then apply nitrate of mercury ointment.

D. Pustules.—These are usually due to the same causes which produce vesicles.

E. Scales or scurf.—(After scarlet fever, measles, German measles, erysipelas.)

1. *Psoriasis*.—Oval or irregular raised red patches, covered with greyish white scales, most often situated about the elbows or knees. Children frequently affected. Few diseases more obstinate to treat.

Treatment.—Children must receive medical advice; arsenic is usually required. When occurring in adults, on the front of the arms and backs of the legs, and absent from the elbows, mercury usually causes the eruption to disappear without any local application.

2. *Pityriasis versicolor.*—Fawn or brownish spots, or patches, usually about the trunk, with fine branny scales. Usually occurs in people who perspire freely, and neglect to change their underclothing frequently.

Treatment—Soft soap and water. Friction of the skin. Sulphur ointment.

3. *Scurf* or ‘*Dandriff*’ of the head. The scalp may be red and irritable, often there are no signs of irritation. Very frequently accompanies acne.

Treatment.—Wash the head with coal-tar soap, and sponge with boracic lotion. Weak sulphur ointment (gr. 30–60, in lanoline, 1 oz.) may be used.

E. Cracks or fissures, usually due to cold, popularly called ‘chaps,’ common on the hands and wrists. Deep fissures, causing much pain, may form on the tips of the thumb or fingers, or in the centre of the lower lip (‘split lip’).

Treatment.—Dry the hands thoroughly after washing, and rub in boracic ointment or simple lanoline. Glycerine is effectual in some cases, but causes much smarting. Split fingers: shave off the hard thick skin forming the edges of the crack, and touch the raw surface with a pointed stick of nitrate of silver, then apply lanoline. Split lip: stretch the lip, and touch the crack with nitrate of silver.

F. Ulcers.—Ulceration of the skin, unless due to injury, is usually caused by constitutional disease, requiring skilled treatment. Tuberculous ulceration is common in children, and is called—

1. *Lupus.*—Begins as dull red spots, usually on the nose or cheeks, which slowly develop into brownish semi-transparent nodules. These nodules coalesce, and then ulceration occurs, which may extend through the skin, and attack the bones, destroying the features.

Treatment.—Medical advice should be sought without

delay; repeated scraping with sharp instruments, and the application of strong caustic. Constitutional treatment, as for tuberculosis.

2. *Lupus erythematosus*.—Occurs most often in middle-aged women. Begins as small, red, scaly spots on the cheeks and nose, which slowly run together, and form red scaly patches; when the patches on the nose and cheeks meet the area of redness resembles the shape of a butterfly. Ulceration rarely occurs; the skin more often becomes thinned and white, like scars in irregular patches. Constitutional disturbance is often absent.

Treatment is unsatisfactory. Protect the face from irritation by wearing a veil. Lead lotion when there is much inflammation. Dusting with boracic and zinc powder. Remove scales with salicylic ointment.

G. Spots without elevation of the skin surface.—

1. *Roseola*, most often seen in teething infants, but common in gouty adults and their children; popularly attributed to acidity. Red spots or blotches, sometimes running into one another, and forming a continuous blush over a large area. Often fever and restlessness.

Treatment.—See NETTLE-RASH, with which it is probably closely connected.

2. *Freckles*, from exposure to the sun.

Treatment.—The following remedies are usually recommended:—‘Lime-water and oil, sal volatile and oil, lemon-juice, vinegar, or emulsion of bitter almonds.’ A highly poisonous lotion, containing perchloride of mercury, is frequently used. [The Editor confesses that his attempts to cure freckles have invariably been unsuccessful.]

3. *Discolorations of the skin*, in spots or patches, accompany many conditions and diseases. It is a normal accompaniment of pregnancy, especially in women of dark complexion. It may be due to sunburn, blisters, or be present in scars. Wasting diseases and certain drugs, nitrate of silver and arsenic, may produce it. ‘Port-wine stain’ is an affection of the capillaries of the skin, a variety of a vascular tumour, known as a ‘naevus.’ These cannot be dealt with by household remedies.

H. Moles, warts, and corns.—1. *Moles* are deposits of pigment, usually accompanied by thickening and other changes in the skin. They can only be removed by strong caustics, or by a surgeon; their removal always leaves a scar.

2. *Warts* may form hard rounded bodies with broad bases, slender projections, or rounded bodies with narrow stems. The cause of their formation is but little understood. The popular belief that they are contagious cannot be mere superstition, though quite inexplicable.

Treatment.—Warts with broad bases may be repeatedly rubbed with nitrate of silver, the hard crust being picked off at intervals of a week; or they may be painted with salicylic acid and collodion daily, the crust allowed to separate, and the painting continued until the wart has disappeared. Slender warts, or those with narrow stems, may be tied with fine silk, or painted with salicylic acid and collodion, around their stems. Sulphate of magnesia, taken in doses sufficient to keep the bowels well relaxed, is said to cause warts to drop off without local treatment.

3. *Corns* are formed by an overgrowth of the horny layers of the skin, both upwards, and downwards into the sensitive layers. They are caused by the pressure or friction of ill-fitting boots. A *hard* corn is situated in a position where the skin is usually dry, a *soft* corn where the skin is moist, such as between the toes. A corn sometimes becomes inflamed, and a few drops of pus form, which cannot escape through the hard skin, causing intense throbbing pain, redness, and swelling of the toe, and often lymphangitis of the foot. When the big toe joint is enlarged, a corn often forms on the skin over an enlarged bursa. (See BUNION.)

Treatment.—Remove the hard skin by soaking in hot water, cutting with a sharp razor, or with a file, and apply salicylic acid and collodion every night at bedtime. Remove the crust and hard skin at the end of a week, and continue the paint until no sign of the corn remains. Keep the surface protected by a piece of plaster or strapping for another fortnight. *Soft* corns may be treated by rubbing off the soft skin, applying the salicylic paint at bedtime, and wearing cotton-wool between the toes during the day. When a corn is inflamed, soak in hot water, and shave off the skin with a very sharp razor, without

cutting deep enough to draw blood; a drop of pus will probably escape, giving immediate relief; apply a boracic fomentation, and rest the foot, until the inflammation has subsided. If pus is not found, foment the foot; if the pain continues, send for a surgeon before the inflammation becomes severe. It is useless to attempt to treat corns by any other means than perforated plasters, if wearing tight boots is continued.

Note.—Moles and warts are sometimes the first stage of far more serious conditions. Moles which make their appearance during childhood or subsequently, particularly if situated on the feet, should always be seen by a surgeon. Warts appearing on the face or lips of adults should either be let alone, or skilled advice obtained. Irritating them with feeble caustics is useless, and may convert a simple growth into a malignant one. They are far better removed as soon as possible. Fleishy moist warts round the corners of the mouth or the anus of an infant indicate some constitutional disease requiring medical advice.

DISEASES OF THE HAIR

Baldness (alopecia).—*Causes.*—Advancing age, severe illness, anxiety. Partial loss of the hair is frequent after childbirth; this is usually only temporary. Diseases of the scalp, ringworm, psoriasis, eczema, and dandruff. One form of premature baldness, often complete, permanent, and affecting children and young adults, is contagious. It is termed *Alopecia areata*, and is by some supposed to be associated with ringworm. The hair comes off in patches, leaving the skin absolutely bald and smooth. There may be only one or two patches of baldness, or the whole hair of the scalp, eyebrows, and of the face generally may be lost.

Treatment.—The general health must be treated, and the cause sought for. (See RINGWORM, DANDRUFF, &c.) *Alopecia areata* is usually treated by lotions containing cantharides, or sulphur ointment. (See APPENDIX.) It appears to be uninfluenced by constitutional remedies.

The best preventive of baldness is care of the hair during health. The head should be washed at least once a week; the yolk of an egg, or a piece of quillaia bark, may be added to the water to produce a lather. Hair lotions and pomatums are not

required, unless the head is immersed daily, when the hair is apt to become dry and brittle. A mixture of lanoline, 56, and oil of almonds, 52, may be used sparingly under these circumstances. Curling the hair with hot irons, and the use of dyes, erroneously called 'hair-restorers,' are probably the cause of many cases of partial or complete baldness in women.

DISEASES OF THE NAILS

The nails usually suffer, to a greater or less degree, in any affection interfering with the nutrition of the skin. The transverse groove on the nails, so often found after an acute illness, is a familiar condition. In some chronic skin affections, such as eczema and psoriasis, great disfigurement of the nails is often present. Local applications, under these circumstances, exert little or no influence, and the general health must be treated.

Onychia is a chronic inflammation at the root of the nail, accompanied by ulceration and discharge. The nail is loosened and discoloured, and the end of the finger becomes red and swollen. It often arises from some trivial injury in persons of weak health. It is very common in strumous children, and in them it may occur without any obvious cause; the swelling is very gradual, and often painless. The deformity of the finger may be very great.

Treatment.—In severe cases the nail must be removed, an extremely painful operation, requiring a certain amount of skill. The constitution almost invariably requires attention. If very painful, boracic fomentations may be applied, but dry dressings are preferable, such as dusting with boracic acid, powdered nitrate of lead, or iodoform. The finger must be protected from injury.

Ingrowing nail rarely occurs, except on the big toes. The condition is brought about in the following way. A short, tight boot is worn, and the flesh is pressed and irritated by the nail. Swelling occurs, and the corner of the nail is cut off as low down as possible. The boot is worn again, and the flesh having lost the support of the nail, is pressed inwards. Relief is at

first experienced, but the nail as it grows up soon forces its way into the displaced flesh, which becomes irritated and still further swollen. The more the nail is cut, the worse the condition becomes.

Treatment.—Ingrowing toe-nail would rarely occur if the nails were properly attended to. The nails of the toes should not be cut too short, and always quite square across, the corners being carefully preserved, and not rounded off. The débris of skin, forming a soft pad under the nail, should not be picked out with a knife or scissors; a brush should be used for the feet as well as for the hands. When a toe has become inflamed from a tight boot, the skin at the edge of the nail should be moistened, touched with nitrate of silver, and a wet dressing applied on going to bed. Easy boots should be worn next day. If the nail has been cut and is growing in, the nitrate of silver should be applied to the swollen flesh every other night, and wet dressings used. At the end of a week the thickened and black layer of skin can usually be removed, and a flake of cotton-wool should be gently pressed under the nail, moistened with water and touched with nitrate of silver, and left under the nail. This must be repeated every three days. The nail is thus liberated, and grows up free from the flesh; it should not be cut until it has reached the top of the toe, when it must be cut quite square across.

Exostosis under the nail of the big toe is a comparatively common affection. It is often attributed to an injury, such as the toe being heavily trodden upon. There is thickening of the tissues of the end joint of the toe, forcing the nail up, and making it extremely convex. The symptoms which first attract attention are aching pains without signs of inflammation, and difficulty in getting new boots, which all seem to press on the affected toe. The condition is caused by the growth of a rounded mass of cartilage and bone, usually about the size of a cherry-stone when removed, springing from the terminal phalanx of the toe.

Treatment.—Medicines and external applications exert no influence on the bony growth. The patient is fairly comfortable in a boot made with a wide interval between the toe-cap and the sole; but ultimately the growth will require removal by a surgeon.

Care of the nails.—The nails of the fingers should be cut round, those of the toes, square. In both situations a soft brush only should be used for the purpose of cleaning them. If a knife is used, the ends of the nails are thinned by scraping, making them very liable to crack, and by increasing the interval between them and the skin the accumulation of dirt is made more easy. The skin at the root of the nail should be pressed down daily, and not cut away.

OFFENSIVE PERSPIRATION

An excessive secretion of perspiration, attended with an offensive odour, is a common affliction which causes much distress. The feet are most often affected.

Treatment.—The skin must be washed twice a day with carbolic or coal-tar soap, dried, and then dusted with boracic acid. The powder should be thoroughly rubbed into the skin. The stockings must be changed twice a day, and when removed they should be dipped in boracic lotion, and hung up to dry. The interior of the boots and the feet of the stockings should be freely dusted with boracic acid every time before they are put on. If the perspiration is very profuse, cork-soles should be worn inside the boots, and these should be removed daily, soaked in boracic lotion, and then dried. Tonics of iron and nux vomica are useful.

CHAPTER X

DEFORMITIES

Wry-neck, Torticollis—Deformities of the Spine : Lateral Curvature ; Angular Curvature or Caries—Bow-legs—Knock-knee—Flat-foot—Pointed Foot—Weak Ankles—Contractions of the Fingers—Hammer-toe.

Stiff-neck, wry-neck, torticollis, may be caused by (1) strain of the muscles of the neck during birth ; (2) inflamed glands ; (3) muscular rheumatism ; (4) disease of the vertebræ of the neck, ‘spinal caries.’

Symptoms.—The head is held stiffly to one side, and the face and chin are turned towards the opposite shoulder. The sternomastoid muscle is usually prominent, and can be felt as a hard tense band.

Treatment.—The cause must be searched for and treated. Lice in the head is a common cause of the glands being inflamed. When noticed in infants, the muscles of the neck must be rubbed daily, and the head gently pressed towards the opposite shoulder ; when put to bed, the child should lie on the affected side, and the head be supported on a firm and rather thick pillow. Severe cases can only be treated by operation, or carefully fitted supports. Treatment should not be postponed, because if the condition is unrelieved a peculiar alteration in the face occurs : one side of the face does not develop properly, and the mouth becomes crooked.

DEFORMITIES OF THE SPINE

Disease of the spine producing deformity may be due (1) to weakness of the muscles and stretching of the ligaments so that the vertebræ lose their support, and the spine bends laterally, and at the same time becomes somewhat twisted, the condition

being called *lateral curvature*; or (2) to disease of the bone, usually in the front of the bodies of the vertebræ, so that they fall together and an angular backward projection forms. This is called *angular curvature* or *spinal caries*. It is very important to distinguish these conditions, as the treatment is wholly dissimilar.

Lateral curvature most often occurs in rapidly growing boys and girls of feeble muscular development. It may also occur, in a very severe form, as the result of rickets in childhood, or acute disease, causing collapse of one of the lungs. Prolonged standing, stooping over a desk, carrying a heavy burden such as a baby on one arm, may produce it, especially if the general health is impaired by anæmia or want of exercise and fresh air.

Symptoms.—Stooping the head when standing up, one shoulder being carried higher than the other, or one of the shoulder-blades projecting, is usually first noticed. If the patient is made to undress, and the fore-finger is passed down the spine, the bony projections of the vertebræ, instead of being one above the other in a vertical line, will be found to form a curve, usually to the right. At the same time the right shoulder-blade will be noticed to project, owing to the ribs underlying it being more prominent than those on the opposite side. On looking at the front of the chest, the right breast looks flattened, the left prominent, and the breast-bone often projects, forming what is known as ‘pigeon-breast.’ Unless the deformity has been present for many years, it disappears when the patient bends forward and touches the toes, or hangs by the hands from a bar, but returns immediately the erect position with the arms by the sides is resumed. These movements cause no pain.

Treatment.—These cases rarely require any form of spinal support. The deformity disappears if the general health is improved and the muscles developed by exercise. Tonics of iron and nux vomica are useful, and the diet must be nourishing, animal foods and fats being particularly required. Active exercise should be taken, alternating with absolute rest. Long dragging walks, standing, and sitting on a stool or form without any back support, are injurious. Romping games in the fresh air are beneficial. A cold or tepid bath should be taken in the

morning, and the back briskly rubbed with a rough towel. When it can be managed, the patient, when indoors, should lie flat on his back on a firm couch for several hours during the day. These periods of rest must be broken at frequent intervals, and some vigorous muscular exercise indulged in for a few minutes, such as using light Indian clubs or dumb-bells, or a turn on the horizontal or parallel bars. If the spine is curved to the right, the left arm should be exercised more vigorously than its fellow. A heavier dumb-bell may be used, or the patient may be taught to fence or single-stick with the left-hand. Extension movements, particularly those known as Swedish gymnastics,¹ skipping, and swimming are all excellent, but no exercise should be prolonged after the muscles have become fatigued, and the patient should then rest on the couch.

Angular curvature or spinal caries may occur at any age, but is often met with in quite young children. The patient is very frequently a member of a tuberculous family, but a fall or a blow on the spine is commonly the cause to which the disease is attributed. There are invariably symptoms pointing to disease of the spine before any deformity is noticed, and it is important to recognise these, because when deformity does occur, though the disease may be arrested by care, the spine can never be restored to its proper form.

Symptoms vary according to the part of the spine affected, but the first thing noticed in a child is that it loses its careless movements, carries itself stiffly, and often supports its weight with its hands by any surrounding object, such as a chair or a table. It becomes careful in avoiding any jolting movement, avoids any active game, and gets down from a chair or bed slowly and cautiously. In picking up an object from the floor, the child places its hands on its knees and bends the legs slowly, gradually lowering the body, and keeping the spine stiff and straight. In rising, it will push itself up with the hands on the knees, or catch hold of a neighbouring chair and pull itself up. When the vertebræ of the neck are affected, the head is held stiffly back and the chin protruded, and if the child wishes to look to either side, it turns the shoulders and body. Attacks of

¹ *Ling's System of Swedish Gymnastics*, published by Baillière, Tyndall & Co., London.

pain are common, usually worse at night; there may be neuralgic pains shooting up the back of the head, or down the arms when the neck is affected, or stitch in the side, stomach-ache, or pains in the thighs, according to the seat of the disease. Pressure on the top of the head often causes pain, and on gently tapping the spine with the fingers, tenderness is usually found over the affected area. After a time one or more of the vertebræ may be found to form a projection at one point in the back, and this is the first indication of commencing deformity. Any stooping movement causes great pain unless performed with the utmost caution. The stiffness of the spine in angular curvature is very striking when compared with the free mobility present in lateral curvature. When once deformity commences, the future progress of the disease largely depends on the general health and the treatment adopted. In spite of the most devoted care and skill in treatment, large abscesses sometimes form.

Treatment requires great judgment, and a surgeon should be consulted without delay. The disease is often simulated by hysterical persons, and errors may be made in spite of every possible care, even by skilled observers. Absolute rest, both day and night, is at first essential, so as to keep the diseased bones from pressing on one another. This may have to be prolonged for years, the child being kept lying flat on a mattress, which can be moved from the bed on to a wheeled chair when going out of doors. The diet and general treatment must be conducted on the lines indicated for tuberculosis. When the disease becomes quiescent, some form of spinal support is necessary in which the patient may be allowed to get about. These are made of felt, plaster of Paris, or a combination of steel supports with leather bands. They all have the same object, to relieve the diseased bones from bearing any weight, and to keep the spine rigid. Their selection and proper adjustment can only be carried out by a surgeon.

BOW-LEGS AND KNOCK-KNEE

Bow-legs to a limited degree, as seen in grooms and cavalrymen, is simply the result of their occupation, and is no sign of weakness, but when occurring in children it is usually due to rickets. It may be present in children who are born with club-

foot, and the deformity is then usually very marked, and requires treatment by a surgeon.

Treatment.—When a child is learning to walk, and the legs are noticed to be bowing, a careful examination should be made for other signs of rickets. These will probably be found, and the child must be carefully dieted and kept off its feet. (See RICKETS.)

Knock-knee may be due to rickets, or may occur later under similar conditions to those which produce lateral curvature of the spine, and is frequently associated with ‘flat-foot.’ When knock-knee is present the spine and feet should always be examined for any deformity, and if this is found it must be treated. When occurring in young children, the legs must be douched and rubbed night and morning, and it is usually necessary to keep the child off its feet. Placing a thick pad between the knees, and bandaging the legs together at night, is often effectual when the condition is first noticed. The deformity is likely to become permanent unless recognised and treated early. The bones of the knee-joint become altered in shape, and it is useless to hope that the child ‘will grow out of it.’ The son of well-to-do parents should ride a narrow-backed pony or donkey, but it is useless to seat him on a round animal which his legs cannot stride. Light steel supports with leather straps, extending from the hips to the feet, are useful, but they must be worn constantly. Severe cases can only be benefited by operation.

DEFORMITIES OF THE FOOT

Many forms of club-foot are either congenital or the result of rickets or infantile paralysis. These require treatment by a surgeon.

‘Flat-foot’ or ‘Splay-foot’ is an extremely common condition, and arises from causes which resemble those of lateral curvature of the spine. It usually occurs in early adult life, and is produced by the arch of the foot yielding under the weight of the body. It may be present with ‘knock-knee,’ but often arises in young men and women of feeble muscular development, who have to stand for long hours together in shops.

Symptoms.—Dull aching pain in the sole and along the inner side of the foot. When walking, the toes are turned out, and the gait is awkward and slouching. On examining the feet, the hollow along the inner border is lost, and a bony projection may often be felt. The foot is longer than it should be, and the instep is flat, owing to the bony arch having straightened out. In bad cases the heel looks as if it had been twisted out, and the outer edge is raised, and no longer in contact with the ground. The calf muscles are invariably badly developed, and the ‘broom-stick’ legs and the large size of the feet are very remarkable. The patient usually has great difficulty in standing on the toes.

Treatment.—The condition can be guarded against by developing the muscles at the back of the legs, the tendons of which are either attached to the heel or run under the sole of the foot and help to sustain the arch. The uncomfortable, stiff-soled boots, which children are so often condemned to wear, are largely responsible for ill-developed muscles of the legs and feet. When the arch is giving way, our aim must be to rest the feet as much as possible whilst the muscles are being developed. Active exercise must alternate with complete rest, as in treating lateral curvature of the spine. The circulation is often feeble, and iron tonics are necessary. The legs and feet should be bathed in salt and water, and briskly rubbed night and morning. Any exercise which necessitates lifting the heel and bearing the weight on the toes is beneficial. Dancing, skipping, and running on the toes should be practised. Every morning and the last thing at night the patient should raise himself on his toes, up and down repeatedly, increasing the number of times daily as the muscles get stronger. Long dull walks, carrying weights, and standing for any length of time, must be avoided. The boots must have low broad heels, and the under-tread should be broad but flexible. There are many kinds of boots sold to support the instep by means of steel plates, or a prolongation of the heel along the inner side of the sole. It is not advisable to purchase these indiscriminately, though they are valuable in properly selected cases. Unless boots are specially ordered by a surgeon it is better to trust to exercises in treating flat-foot.

Pointed foot, or inability to bend the ankle so as to bring the heel to the ground when standing erect, is usually due to

contraction of the calf muscles. The result is that the leg is too long, and the toes catch the ground when walking. It is more or less present in most forms of club-foot, and in these cases it must be remedied by operation. The condition is often acquired after injuries to the leg or ankle which require prolonged rest. Under these circumstances the foot naturally drops, and the powerful calf muscles obtain the mastery over those of the front of the leg, and, unless guarded against, the contraction may become permanent. In all cases of fracture of the leg and sprains of the ankle, the foot should be fixed at right angles with the leg, or, what is still better, somewhat bent up towards the shin. If this is impossible, whenever the ankle can be moved the foot should be gently forced up towards the shin, so as to stretch the calf muscles. This movement must be regularly practised during convalescence from sprains of the ankle or fracture of the leg. Douching and friction of the muscles are useful, but much perseverance is necessary if an operation is to be avoided.

‘**Weak ankles**’ is an expression commonly used when children tread their boots over. It is very often the fault of the boots, which are either too short or stiff, or may be due to a fat heavy child being too much on its feet. If neglected, flat-feet or knock-knee may result.

Treatment.—Artificial supports are rarely necessary, and boots with stiff upper leathers to support the ankles are injurious as a rule. If the condition is very marked, the child must be kept off its feet altogether, the legs and ankles diligently rubbed, and the general health attended to. In slight cases, shoes must be bought with broad pliant soles and low broad heels. The ankles must be rubbed, and only active games allowed, the child being kept off its feet in the intervals, and standing about and slow walks prohibited.

CONTRACTIONS OF THE FINGERS AND TOES

These deformities often occur in several members of the same family. Contraction of the fingers is far more common in men than in women, and is often attributed to injury of the palm, by constantly handling some hard object, such as a fishing-

rod, gun-stock, or chisel. The little, or ring-finger, is most frequently affected, and becomes bent down into the palm, seriously impairing the use of the hand. On attempting to straighten it, the skin beyond the deep transverse fold of the palm may be noticed to be dimpled, due to adhesions with the deeper structures. This condition usually becomes progressively worse, but it may be delayed by constantly stretching the finger, and friction of the palm with some lubricant, such as vaseline. If the use of the hand is interfered with, the finger may be liberated by operation. Any gouty tendency must be treated on general principles.

‘**Hammer-toe**’ is commonly caused by pointed-toed and high-heeled boots, but it may occur without any discoverable cause. The second toe becomes bent down at right angles, so that the nail looks forwards instead of upwards, and a corn forms over the joint from constant friction against the boot. The big toe loses support, is displaced towards the other toes, and a bunion often forms over the joint.

Treatment.—Boots with low heels and broad toes must be worn. An endeavour must be made to stretch the toe, the corn must be treated, and the joint protected from pressure by a circular pad. If the toe can be straightened, it should be fixed in this position to the two adjoining toes, which are made to act as splints, by a narrow piece of strapping encircling the three toes. If the joint is rigidly fixed, and much inconvenience is caused by pressure of the boot, or the foot getting trodden on, the toe may be straightened by operation. (See **INGROWING TOE-NAIL**.)

PART VIII

PREGNANCY, LABOUR,
DISORDERS OF MENSTRUATION

CHAPTER I

PREGNANCY AND LABOUR

Signs of Pregnancy—Duration of Pregnancy—General Hygiene—Disorders of Pregnancy—Loss of Blood and Miscarriage—Signs of Impending Labour—Preparations for Labour—Management of Labour—Management of the Child—Disorders following Child-birth.

Signs of pregnancy.—Cessation of the monthly periods; nausea, often with actual vomiting, on rising in the morning; neuralgic pains, and weight and fulness in the breasts; prominence of the nipples, and alteration in the colour of the surrounding skin; enlargement of the abdomen about the end of the third month; between the fourth and fifth month, ‘quickenings,’ feeble fluttering sensations, due to movements of the child gradually increasing in force. These symptoms must be taken together; singly, they cannot be relied upon.

Duration.—Date from the cessation of the last period, 280 days—that is, nine calendar months and seven days. For example—last day unwell, 1st January; nine months and seven days forward will be 8th October, the probable date of the confinement.

General hygiene.—Regular outdoor exercise should be taken; sudden strains, lifting weights from the ground or from shelves, must be avoided. Simple diet, with plenty of milk. Loose, comfortable clothing. Cheery society; excitement, anxiety, and distressing sights should be guarded against. A daily action of the bowels must be ensured, by mild aperients or enemas.

Common disorders.—*Nausea and vomiting* are best treated by giving some light food, such as half a tumbler of milk and

soda-water, or a cup of coffee and a biscuit, before rising. The diet must be limited to the most simple forms of food. Saline aperients. Small doses of bromide of potassium, or ipecacuanha wine, $\text{m}2$, four times a day, are useful. Vomiting almost invariably ceases about the time of 'quickening,' the fourth month. *Constipation, diarrhœa, varicose veins, and piles* may be treated on the ordinary lines. If *swelling of the face and ankles, difficulty in passing or incontinence of urine* are noticed, a doctor must be consulted. During the later months of pregnancy, if the abdomen is very relaxed and protruding, support must be given by a broad flannel binder, or abdominal belt.

Care of the nipples.—During the last two months of pregnancy the nipples should be gently drawn forward every day, so as to make them stand out well, and hardened by bathing with brandy, or eau-de-Cologne, and water in equal parts.

Loss of blood during pregnancy—miscarriage.—Hæmorrhage during pregnancy is almost invariably due to a condition requiring skilled treatment. It occasionally occurs at the normal periods of menstruation, but when it takes place at irregular times, there is probably a miscarriage or other trouble impending. The patient should be immediately put to bed in a cool room, and kept at absolute rest, until a doctor has seen her. If there is great loss of blood, cloths dipped in cold vinegar and water must be applied to the external genitals, and constantly renewed. If it continues, dry cloths must be firmly held, or secured by means of a well-applied T-bandage, in this position, and if medical advice cannot be obtained, a full dose of opium must be given. The cloths must be removed at the end of twelve hours, but even if the bleeding has ceased, the patient must on no account be allowed to move. A neglected miscarriage is the cause of many diseases, and few cases can safely be allowed to get up, and resume anything approaching an active life, for at least a fortnight.

Signs of impending labour.—When the full term is completed, for a few days before labour there may be a slight sinking of the abdominal swelling, and the breathing becomes easier, but walking and the action of the bowels are rendered

more difficult. A slight blood-stained discharge, or a sudden gush of watery fluid, makes it probable that labour is imminent. The doctor should be immediately informed by a note, stating the hour the discharge was first noticed, and any other symptoms which may be present.

Preparations.—The following articles are indispensable :—

1. Basins, soap, water.
2. Nail-brush.
3. Napkins or clean towels.
4. Scissors (blunt-pointed).
5. Strong thread, knotted into two skeins, six strands in each, a foot long.
6. A large piece of flannel or a blanket, in which to wrap the infant.
7. A binder, 50 inches long and a yard wide, of stout calico. A folded tablecloth may be used.
8. Large ‘safety’ or strong pins.

Many other sick-room accessories and antiseptic preparations are desirable ; a list of these is usually made beforehand by the doctor or monthly nurse engaged to attend the confinement. The bed should be prepared in the following way ¹:—‘The mattress being uncovered, a large piece of mackintosh sheeting is to be spread over it, and upon this a blanket and sheet. Over these should come another piece of waterproof sheeting, large enough to reach from the middle of the back to the knees. Upon this upper mackintosh, and ready to be removed with it after the labour is over, are to be placed a folded blanket and, lastly, a folded cotton sheet, both of which should reach well above the hips so as to absorb the discharges. Two pillows are then to be put in the centre of the bed, so that the patient may lie with the upper part of the body directly across the bed, the hips being as near the edge as possible.’ A long ‘jack’ towel should be fastened to the post, or end of the bed, near the patient’s feet. This is for her to pull on during the strong pains towards the end of the labour.

Management of a natural labour.—It is no uncommon event for a confinement to take place in the absence of a doctor

¹ *Manual for Monthly Nurses.* Cullingworth.

or skilled nurse, though their presence is much to be desired in all cases. The following remarks are for the guidance of an untrained person who has to lend assistance when skilled help is unobtainable.

First stage.—At the outset of labour it is always desirable to secure the thorough evacuation of the lower bowel, and, when possible, a soap and water enema should be given. The patient may take her usual food, but stimulants must be avoided. The pains are first of a griping character, felt in the lower part of the front of the abdomen, and usually not very severe. The patient need not be in bed, but may walk about the room or sit in a chair. The nurse meanwhile gets the bed ready, collects the necessary articles, and places them at hand on a table cleared for the purpose. She should turn up her sleeves, put on a clean apron, and thoroughly clean her hands and wrists with a nail brush. If any antiseptic solution can be obtained, such as Condyl's fluid or boracic acid, it should be mixed in a basin, and the hands dipped in it before she touches the patient. This should be constantly repeated throughout the labour, and soiled napkins or diapers should never be changed without first thoroughly cleansing the hands both during the labour and afterwards. The importance of absolute cleanliness in the management of confinements cannot be too strongly urged. This should be carried out on the lines laid down in the treatment of wounds. (See CLEANSING WOUNDS.)

Second stage.—The pains become more frequent and regular, and shift round to the back and loins. They begin gradually, then increase in intensity, compelling the patient to hold her breath, and gradually subside, leaving her at ease for a time. They become more intense, recur more frequently, and last longer as the labour progresses. They are usually described as 'straining,' 'forcing,' or 'bearing down,' and the patient groans involuntarily when they are at their height. She should now go to bed, and lie on her left side with the legs drawn up. Fluid food only should now be given; she may take tea or water in small quantities. Considerable relief is often given by pressing and kneading the loins during the pains; merely rubbing the skin is useless. Cramp in the legs is now very common; the limb should be forcibly straightened, the ankle bent, and the muscles rubbed. The pains become stronger and more frequent, the

patient becomes hot and flushed from her exertions. She should be encouraged to hold her breath and pull on to the towel during each pain. A profuse gush of water may occur at any period during this stage. The external parts may now be noticed to bulge with every pain, and a pillow should now be placed between the patient's knees. After a varying period, often of considerable duration in a first confinement, the infant's head is protruded. This should be supported in the palm of the hand, but not pulled on, or its movements controlled in any way. The features are swollen and congested; occasionally they cannot be recognised, owing to the head being enveloped in a white glistening membrane; this should be at once pulled away. There may be a short interval after the birth of the head, but often the body and legs follow immediately. A thick twisted glistening cord is now seen issuing from the mother to the infant's navel. It is sometimes found twisted once or twice round the infant's neck, and must be freed by passing the loops over the head. The child now usually draws a few spasmodic breaths, and then begins to cry shrilly. If it does not do so, it should be gently flicked with a handkerchief dipped in cold water, and any mucus should be wiped away from the nose and mouth. The child's eyes should now be carefully wiped with a clean napkin. Now wait for five minutes, and then tie the cord. To do this, place one ligature round the cord two inches away from the child's navel, and make the first turn of the knot thoroughly tight with a firm steady pull, then make the second turn, and pull it tight. The second ligature is placed round the cord an inch further away from the child than the first, and the cord is then divided with the scissors between the two. A few drops of dark blood may escape from the divided ends, but this is of no consequence if the ligatures have been tied properly. Having separated the child, wrap it up in the flannel which has been kept in readiness, and lay it on the other side of the bed, or in an armchair, and attend to the mother.

Third stage.—This consists in the expulsion of the 'after-birth,' a large circular fleshy mass with the navel-cord attached to its centre. The nurse should now place her left hand on the patient's abdomen below the navel, and grasp the womb, which should be felt as a firm rounded tumour. If it cannot be felt, the abdomen must be gently kneaded, and when a pain occurs it will certainly

be felt unless the abdominal wall is very fat. The hand should now be kept firmly on the womb, and not removed for any other purpose. Pains will recur at intervals, but are not so severe in character as they were before the birth of the child, and after a period, varying from five to twenty minutes, the womb may be felt to harden and contract to about the size of a large cricket-ball. This diminution in size is due to the escape of the after-birth from the womb into the lower passage. The hold on the womb must still be retained, and in a few minutes a pain will probably occur, and the after-birth will come away with a more or less profuse gush of blood. There is frequently considerable delay in the expulsion of the after-birth; but this is no cause for anxiety, and no attempt should be made to pull it out by means of the cord. If any part of it can be seen projecting from the external orifice, it may be seized with the finger and thumb of the right hand, and drawn away. If the womb continues to be felt as a hard firm ball, all is well, and the hand which has hitherto constantly grasped it may be withdrawn. If it relaxes and cannot be felt, no other call should distract the attention, but the lower part of the abdomen must be firmly kneaded until the womb once more contracts, and can be again grasped in the hand.

After-treatment.—The after-birth having come away, and the womb being firmly contracted, the external genitals and thighs should be washed with warm soap and water, and a clean diaper applied. The soiled night-dress may be drawn down, and the sheet, blanket, and upper mackintosh drawn away. The binder must be rolled up for half its length, and the roll tucked well under the patient's left side and hip; she is then gently turned on to her back so that she lies on the unrolled part of the binder; and the roll is then undone and brought over the front of the abdomen, and made fast with strong pins. The binder should be perfectly smooth and free from wrinkles, and firmly encircle the abdomen from the lower ribs to a little above the middle of the thighs. The patient should then be allowed to go to sleep. During the removal of the soiled linen and the application of the binder the patient must not exert herself in any way, or serious bleeding may come on. During the first four days after labour she must not be allowed to sit up for any purpose. Some little difficulty is often experienced in passing water whilst lying on the back. If this occurs, the patient may be allowed

to turn over on to her face, and raise herself slightly on her hands and knees ; the attempt made in this position is usually successful. She must be reminded to relieve herself within six hours after labour ; if this attempt fails, a second should be made after an interval of an hour. If no urine has been passed during the first twelve hours the doctor must be informed. Overdistension of the bladder is liable to give rise to troublesome consequences. The food given during the first twenty-four hours after labour must be selected according to the wishes of the patient, to a great extent. Usually slops are preferred, and gruel, broths, bread and milk, and tea may be freely given. There is no objection to solid food if the patient expresses a wish for it. An aperient, castor-oil, two or three teaspoonfuls, should be given on the third day.

Management of the infant.—After the mother has been made comfortable, the baby must be washed. A peculiar greasy substance is usually present on the skin, which is best removed by anointing the head and body with warm olive oil or vaseline, and then washing with soap and water. Particular attention must be paid in cleaning the eyelids, and the folds of skin in the neighbourhood of the joints and buttocks. The skin must then be dried with a soft warm towel, and dusted with Fuller's earth or some smooth, unirritating powder. The stump of the navel cord must be gently cleansed and wrapped up with boracic lint, absorbent wool, or scorched linen rag, and a flannel binder applied round the abdomen. On the third day, it must be carefully noted if there are any signs of inflammation about the eyes. (See PURULENT OPHTHALMIA.)

Feeding of the mother and child are described in the chapter, HYGIENE OF INFANCY AND CHILDHOOD. There is usually little or no milk secreted for the first thirty-six hours, but the infant should be put to the breast regularly. If the infant has long fits of screaming, and sucks its hands, it may be pacified in the following way. The nurse mixes a teaspoonful of milk with a teaspoonful of warm water and gives it, drop by drop, by dipping her little finger into the mixture and allowing the infant to suck it off. A teaspoonful or two usually satisfies the child. Food is not required in any quantity for the first two days after birth, and the mixture of sugar and butter so often given is unnecessary, if not harmful. Each time after suckling the child the nipples

must be carefully sponged and dried, and a little lanoline or vaseline smeared on them to prevent the formation of cracks.

Disorders following child-birth.—A *cracked nipple* causes very great pain, and may compel the mother to abandon nursing. If a crack forms, a nipple-shield should be used until healing has taken place. An ointment of salicylic acid, gr. 5, to lanoline, 1 oz., is a useful application, or belladonna and glycerine may be used. These must be carefully washed off before the baby is put to the breast, and re-applied immediately afterwards.

Inflamed breasts are often the result of cracks of the nipples. The breast feels tender and heavy, and there is throbbing pain. There may be patches of redness in the skin.

Hot fomentations should be assiduously applied, and the skin painted with belladonna and glycerine. The milk must be drawn off with a breast-pump, and the child fed from the unaffected side. A doctor should be consulted as soon as possible, as abscesses in the breast should not be allowed to ulcerate through the skin, and burst unaided. They often burrow extensively before this occurs.

Fever.—On the evening after labour the temperature often rises to 99° or 100°, but this is usually unattended by headache or other constitutional disturbance, and falls to normal on the following day. On the third day a slight rise of temperature is again common, and is usually due to the ‘milk coming in,’ and the breasts being swollen and tense. Provided that the discharges are unaltered, and there is no shivering, or tenderness of the abdomen, the temperature will fall if the breasts are fomented, the diet restricted to fluids, and the action of the skin promoted by a diaphoretic containing acetate of ammonia. If there is a shivering fit, accompanied by the discharges becoming offensive, or ceasing altogether, it is possible that the condition is extremely grave. (See SEPTICÆMIA.)

During the second or third week, in a small number of cases, the temperature rises, and pain in one of the legs may be noticed. This is probably due to an inflammation of the veins and lymphatics. (See WHITE-LEG.)

Concluding remarks.—There is usually some discharge from the womb for three weeks after delivery. For the first three or four days it consists almost entirely of fluid blood, and a variable

amount of clot. It then changes its character and becomes a reddish watery fluid, gradually turning to a pale green by the end of the week. The odour is peculiar and disagreeable, but is quite distinct from the putrid smell of decomposing discharges. The main factors in the successful after-treatment of child-birth are absolute cleanliness and bodily and mental rest. The patient should be kept as quiet as possible, should receive but few visitors, and should be sheltered from any excitement, distress, or anxiety. When possible her convalescence should occupy one month—a fortnight in bed; another week in her room, the time being spent principally on a sofa; the fourth week in the house, when she may be allowed to move from one room to another on the same floor. This is a good routine practice. Unfortunately, the poor have so many duties to attend to that they usually regard a fortnight spent in convalescence as ample, and they then resume hard work whilst the tissues are still relaxed.

Weaning.—A child should not be nursed longer than nine months. At the end of that time the mother's strength is apt to fail, and the milk to become poor. Weaning is best effected gradually, the bottle being substituted for the breast at an increasing number of feeds. The breasts usually become swollen and tender, and may remain so for from twenty-four to forty-eight hours after the final act of suckling. A brisk aperient should be given, the food greatly diminished, and fluids as far as possible avoided. The breasts must be wrapped in cotton-wool and firmly bandaged. Belladonna and glycerine paint often makes the pain more tolerable. Relieving the breasts with a breast-pump under these circumstances should be avoided, as the relief is only of very brief duration. The breasts are not thoroughly emptied, further secretion is excited, and the period of suffering prolonged.

CHAPTER II

DISORDERS OF MENSTRUATION

Amenorrhœa — Menorrhagia — Dysmenorrhœa — Leucorrhœa — Inflammation, Tumours, and Displacements of the Womb—The Menopause or Climacteric.

THE monthly period, the catamenia, or menstruation, is subject to considerable variations in health. The average date of its first appearance is the fourteenth year; it occurs earlier in the inhabitants of hot climates, and in girls leading luxurious lives. It becomes irregular about the forty-fifth year, and has usually ceased by the fiftieth year. Menstruation usually occurs every twenty-eighth day, and lasts from three to six days. In some women it recurs regularly every three weeks, in others the intervals are longer than a month. It is usually attended by pain in the loins, fatigue in the lower limbs, and other discomforts, most marked during the first twenty-four hours.

Disorders of menstruation are, in many cases, the result of impairment of the general health, or may be caused by alterations in the position or structure of the womb.

1. Amenorrhœa, scantiness or absence of menstruation, may be due to an acute illness, such as a severe chill, to mental excitement, or general debility. It is a common symptom in anæmic girls, and often associated with flatulent indigestion. Menstruation almost always ceases during pregnancy.

Treatment.—Under no circumstances should strong pills be resorted to. The general health usually requires attention; anæmic girls require iron in some form, and as their health improves the normal flow returns. (See ANÆMIA.)

2. Menorrhagia, excessive menstruation, is common in full-blooded persons. When unattended by discharge in the intervals between the periods, and if the general health is good,

no treatment is usually required beyond rest, simple diet, and the avoidance of alcohol. When accompanied by loss of blood, however slight, in the intervals, *metrorrhagia*, by any form of discharge, or constitutional disturbance, it is a symptom which urgently calls for skilled treatment. The cause is very possibly some condition easily benefited, or it may be one which may give rise to serious results if any time is lost. It is quite impossible to diagnose the condition without examination.

3. Dysmenorrhœa, painful menstruation, is most often met with in women leading luxurious lives, in debilitated or neuralgic persons. It may be simply a slight increase of the pain which usually attends menstruation in health, or may be so acute as to completely prostrate the patient. The pain often occurs for one or more days before the flow commences, and then disappears, or it may recur at intervals, the flow usually intermitting at the same time. In many cases it is due to a relaxed condition of the muscular walls of the womb, allowing the blood to collect, and clot in the interior; the difficulty in expelling the clots is the cause of the pain.

Treatment.—A healthy, active life is often all that is needed. Constipation must be treated, and the causes of neuralgia avoided. When the pain is present, a hot hip-bath may be taken, or a mustard poultice applied to the abdomen. Sal volatile, or the liquor ammon. acet., may be given in hot water. Bromide of potassium, or valerian, are useful in hysterical patients. Neither opium nor spirits should ever be given for this condition, except under medical advice.

Leucorrhœa, ‘whites,’ a discharge of white, greenish, or purulent fluid, is a common symptom in many conditions, and may cause distressing irritation, *pruritus*, of the external parts. It occurs frequently in anæmic girls, and in women who have borne many children and lead laborious lives.

Treatment.—If it does not yield to the constitutional treatment for anæmia in young girls, an injection of boracic acid and alum may be used with a Higginson’s syringe. The powders may be mixed in equal parts, and a teaspoonful added to the pint of warm water. When occurring in older women, a doctor

must be consulted, and the cause ascertained; it is futile to trust to syringing, irrespective of the cause, and valuable time may be wasted. In *pruritus*, frequent injections of boracic and alum must be used. Hot hip-baths. Smear the external parts with boracic ointment.

Inflammation, tumours, and displacements of the womb give rise to symptoms which cannot be relied upon in making a diagnosis without an examination being made. Menorrhagia, abdominal pain, leucorrhœa, and irritation of neighbouring organs, may all be present. Blood-stained discharge should always receive prompt treatment under skilled supervision. Inflammation and displacements of the womb are most often the result of neglected miscarriages, or laborious occupations resumed too soon after childbirth. The origin of tumours is, for the most part, obscure; their early recognition and treatment is all-important.

The menopause or climacteric.—The cessation of menstruation usually occurs between the ages of 45 and 50, and is marked by symptoms which may persist for a considerable period.

Nervous: headaches, irritability, or depression, the sensation of a ball in the throat.

Disturbance of the circulation: flushing of the face, palpitation of the heart, chilliness, or heats.

Digestive disturbance: flushing and distension after food, flatulence, and constipation.

Hæmorrhages from the nose, varicose veins, and piles. The symptoms are usually most severe in women of nervous temperament, and those who have no children or duties to distract their attention.

Treatment.—The diet should be sparing, and alcohol avoided, or taken in extreme moderation. Aperients. The medicinal treatment is similar to that for hysteria, bromide of potassium and valerian being particularly useful. The hæmorrhages usually give relief, and, except in the case of varicose veins, should not be too readily checked. Outdoor exercise and occupations which divert the mind should be encouraged.

APPENDIX

APPENDIX

DISINFECTANTS

1. **Carbolic acid**¹ is a highly poisonous substance exerting a corrosive action on the tissues when applied in a concentrated form. No one with any knowledge of its action would attempt to use it for the purpose of committing suicide, owing to the agonising pain it causes; but many deaths have occurred from its being taken by accident. The crude carbolic acid used for disinfecting clothes, scrubbing floors, &c., is a brown, oily-looking fluid, and is used in the proportion of acid 1 part to 40 parts of water—*i.e.* acid 1 oz., water 2 pints. It should be mixed with hot water and thoroughly stirred with a spoon until all the oily globules, which sink to the bottom of the vessel, have disappeared, or the hands may be cauterised in introducing or wringing out clothes.

The refined carbolic acid, used for surgical instruments and lotions, is colourless or pale pink; it is used in the proportion of acid 1 part to water 20 parts (one ounce to the pint), for cleansing instruments, and 1 part to water 40 parts (half-an-ounce to the pint), as a lotion for wounds. This solution causes some smarting when first applied to a wound, but this is soon followed by numbing of the tissues.

1. *Carbolic acid solution A.*—The crude acid 1 oz., water 2 pints, used for moistening door sheets, scrubbing floors, cleaning bed-pans.

2. *Carbolic acid solution B.*—Pure acid 1 oz., water 1 pint (1—20), for cleansing the hands and instruments; acid $\frac{1}{2}$ oz., water 1 pint (1—40), for wounds.

3. *Carbolic oil.*—Acid $\frac{1}{2}$ drachm, olive oil 2 oz. (3 per cent.), for dressing wounds, &c.

4. *Carbolic soap* (5, 10, or 20 per cent.).

5. *Carbolic powder.*—There are two kinds: (1) for vaporising by means of heat, used in treating whooping-cough; (2) disinfecting, used for placing in commodes and urinals.

¹ Carbolic preparations are made by numerous manufacturers. Calvert's are obtainable almost everywhere, and the preparations are numbered according to their purity.

'No. 2' is a pure preparation suitable for lotions.

'No. 4' is best used for disinfecting clothes, moistening sheets hung outside the door of an infectious case, and for general indoor use.

'No. 5' is a cheap and crude, but efficient, preparation. It is evil smelling, but suitable for water-closets and outdoor use.

'Concentrated powder' (50 per cent.) for vaporising; 'Disinfecting powder' (15 per cent.) for closets, urinals, &c.

II. Permanganate of potash ('Condy's fluid.')—Permanganate of potash, undissolved, exists in the form of slender dark purple crystals. Its solutions are crimson in colour, but become brown on prolonged exposure to the air, and on the addition of soap; they discolour clothing, and turn the skin and nails brown if used too strong. They should be stored in glass-stoppered bottles.

1. *Concentrated solution*.—Crystals 1 oz., water 1 pint; this may be kept as a stock solution and diluted to form 'Condy's fluid.'

2. '*Condy's fluid*' can be made by mixing rather less than $\frac{1}{4}$ oz. of the above solution with water 1 pint—*i.e.* 80 grains to the pint, or 4 grains to the ounce. Solutions of this strength are used for moistening door sheets and general purposes.

3. *Solutions of permanganate of potash*, used as a gargle, a mouth-wash, for sponging the body in infectious fevers, and as an antiseptic for cleansing wounds, may be made by diluting Condy's fluid with forty times its bulk of water ($\frac{1}{2}$ oz. to water 1 pint), or by dissolving the crystals, 2 gr. in water 1 pint.

When the colour of these solutions has turned from crimson to brown their antiseptic properties are destroyed. They must never be used with soap. When preparing to dress a wound, the hands must first be washed with soap and water, and after completely washing off the soap in fresh water the hands may be dipped in the solution.

III. Boracic acid is sold in the form of a white powder, giving a silky feeling to the skin when rubbed between the finger and thumb. It is a somewhat feeble antiseptic, but its comparatively unirritating and non-poisonous properties make it a most valuable substance for household use. It is soluble to the extent of $\frac{3}{4}$ oz. in a pint of *cold* water, 6 oz. in a pint of *boiling* water.

1. *Boracic acid powder* is used for dusting on the edges of a recently inflicted wound before applying the dressing, for dusting on the skin around a wound, and on irritated skin surfaces.

2. *Boracic lotion*.—Powder 5 drachms, in water 1 pint (15 gr., water 1 oz.). May be used as a gargle, a mouth-wash, for cleansing and dressing wounds, for hot fomentations, and as an enema in dysentery and mucous diarrhoea.

3. *Boracic ointment*.—Powder 1 drachm, in lanoline or vaseline 1 oz. For dressing granulating wounds and protecting burnt or scalded surfaces.

IV. Iodoform.—A bright yellow powder with a disagreeable pungent odour. A powerful antiseptic, useful in the treatment of tuberculous and foul sores. Symptoms of poisoning may occur if it is used too freely; these may take the form of drowsiness, or high temperature and delirium.

LOZENGES

- | | |
|-------------------------------|-------------------------------------|
| 1. Bismuth, gr. 2. | 4. Chloride of ammonium, gr. 3. |
| 2. Catechu, gr. 1. | 5. Ipecacuanha, gr. $\frac{1}{4}$. |
| 3. Chlorate of potash, gr. 5. | 6. Tannic acid, gr. $\frac{1}{2}$. |

ENEMAS

1. *Starch mucilage*.—Starch 1 tablespoonful, water 1 pint. Add the water gradually to the starch, mixing it well; then boil for a few minutes, constantly stirring.

2. *Glycerine*.—One to four teaspoonfuls, injected with a small syringe.

3. *Soap and water*.—Take common yellow soap and make a thick lather with tepid water. Any soap may be used, except scented soap, which irritates the bowel. Inject 1 to 3 pints.

4. *Olive oil*.—Mix 6 tablespoonfuls of oil with starch mucilage 1 pint.

5. *Castor oil*.—Mix $\frac{1}{2}$ or 1 oz. with starch mucilage 1 pint.

6. *Turpentine*.—Take spirits or oil of turpentine $\frac{1}{2}$ oz., mix with the yolk of one egg, add gradually $\frac{1}{2}$ pint starch mucilage.

7. *Opium and starch*.—Tincture of opium 20 minims, starch mucilage 2 oz.

8. *Boracic lotion*.—Boracic powder 5 drachms to water 1 pint.

9. *Salt and water*.—Table-salt 4 tablespoonfuls, water 1 pint.

10. *Infusion of quassia*.

11. *Tannic acid*, 10 grains, water 2 oz.

12. *Nutrient enemias*.—See p. 128.

SUPPOSITORIES

Cubebs.—Powdered cubebs 5 grains, oil of theobroma 10 grains.

Opium and lead.—Each contains opium 1 grain, acetate of lead 3 grains.

Glycerine is now prepared with gelatine in the form of suppositories of various sizes.

Belladonna.—Extract of belladonna $\frac{1}{2}$ grain, oil of theobroma 15 grains.

Tannic acid 3 grains, in oil of theobroma.

SOLUTIONS USED FOR MOUTH-WASHES, GARGLES,
AND THROAT-SPRAYS

1. *Boracic acid* 100 grains, water 10 oz. ($\frac{1}{2}$ pint).

2. *Permanganate of potash* 1 grain, water $\frac{1}{2}$ pint.

3. *Chlorine solution* is thus made: Place 10 grains of powdered chlorate of potash in a pint bottle, and add 30 minims of strong hydrochloric acid. When the gas begins to be given off, cork the bottle and let it stand for two minutes. Lastly, add distilled water, 1 pint, gradually, corking and shaking the bottle after each addition.

4. *Chlorate of potash* 100 grains, water $\frac{1}{2}$ pint.

5. *Alum* 100 grains, water $\frac{1}{2}$ pint.

6. *Tannic acid* 100 grains, glycerine $\frac{1}{2}$ oz., water $\frac{1}{2}$ pint.

7. *Tincture of perchloride of iron* 3 drachms, glycerine $\frac{1}{2}$ oz., water $\frac{1}{2}$ pint.

Two teaspoonfuls of honey may be added to these solutions, making them less objectionable to children.

INHALATIONS (see p. 151)

Benzoin, compound tincture.	} One teaspoonful to a pint of hot water (140° F.).
Eucalyptus oil.	
Turpentine, spirits.	

LOTIONS

A. Used in Cleansing and Dressing Wounds

1. *Boracic lotion*.—Boracic acid 5 drachms, water 1 pint.
2. *Permanganate lotion, or Condy's solution*.—Powdered crystals 2 grains, water 1 pint; or Condy's fluid $\frac{1}{2}$ oz., water 1 pint.
3. *Carbolic acid* $\frac{1}{2}$ oz., water 1 pint.
4. *Tincture of iodine* 2 drachms, water 1 pint.
5. *Alcoholic solutions*.—Rectified spirit, brandy, or whisky 2 oz., water 1 pint.
6. '*Black wash*.'—Calomel 1 drachm, lime-water 1 pint.

B. Astringent, for Granulating Wounds

1. *Zinc lotion*.—Sulphate of zinc 40 grains, water 1 pint.
2. *Alum lotion*.—Alum 80 grains, water 1 pint.

C. Astringent, for Contusions and Inflammatory Affections without a Wound

1. *Spirit lotion*.—Rectified (or methylated) spirit, brandy, or whisky 4 oz., water to 1 pint.
2. *Lead lotion*.—Solution of subacetate of lead 2 drachms, water 1 pint. ('Goulard water.')
3. *Lead and spirit lotion*.—Solution of subacetate of lead 2 drachms, spirit lotion 1 pint.

D. Soothing, for Eczema, Nettle-rash, &c.

Alkaline lotion.—Bicarbonate of sodium, chloride of sodium (table-salt), and boracic acid, of each $\frac{1}{2}$ oz. Mix 1 teaspoonful of the powder with warm water 1 pint.

E. Stimulating Lotion for the Hair

Vinegar of cantharides and glycerine, of each $\frac{1}{2}$ oz., rose-water 8 oz.

OINTMENTS

1. *Boracic ointment*.—Boracic acid 1 drachm, vaseline or lanoline 1 oz.
2. *Zinc*.—Oxide of zinc 1 drachm, vaseline or lanoline 1 oz.
3. *Sulphur*.—Sublimed sulphur 2 drachms, vaseline or lanoline 1 oz.
4. *Nitrate of mercury*, or 'citrine ointment,' requires skilled preparation.
5. *Yellow ointment*.—Yellow oxide of mercury 1 grain, to vaseline 1 drachm. Used in affections of the eyes. (The much-advertised 'Golden Ointment' contains similar ingredients, but is far stronger than the above.)
6. *Pomatum for the hair*.—Lanoline 3 oz., oil of almonds 1 oz.

OIL, PREPARATIONS MADE WITH

A. For Dressing Wounds, Burns, and Scalds

1. '*Carron oil*.'—Linseed oil and lime-water in equal parts.
2. *Carbolic oil*.—Carbolic acid 1 drachm, olive oil 4 oz.
3. *Turpentine*.—The refined oil, called terebene, 1 oz., olive oil 4 oz.
4. *Eucalyptus oil* 1 oz., olive oil 4 oz.

B. For Inhaling

Eucalyptus oil.—See 'Inhalations.'

Parolein and menthol solution, for nose and throat spray.—Menthol 1 drachm, parolein 1 oz. (This preparation requires a special form of spray-producer.)

C. Camphorated oil.—See 'Camphor Liniment.'

LINIMENTS

1. *Belladonna*.—The method of preparation requires special skill.
2. *Camphor* ('Camphorated oil').—Camphor 1 oz., dissolved in olive oil 4 oz.
3. *Turpentine*.—Camphor $\frac{1}{2}$ oz. is dissolved in oil of turpentine 8 oz.; soft soap 1 oz. is then mixed by rubbing.
4. *Iodine liniment (only suitable for use as a paint)*.—Tincture of iodine 2 drachms to turpentine liniment 1 oz. is a useful liniment in many affections.
5. *Menthol* 3 drachms, chloroform $\frac{1}{2}$ oz., olive oil added to make 2 oz. A most useful liniment and paint.

PAINTS

1. *Belladonna*, extract of, $\frac{1}{2}$ oz., glycerine $\frac{1}{2}$ oz., rubbed up together.
2. *Iodine tincture*.—Two applications a day can usually be borne, until the skin becomes tender. Few skins tolerate iodine *liniment* being painted on more than once every other day, and rarely more than three applications.
3. *Menthol liniment*.—See above.
4. *Collodion*.—(Must be kept well corked in a cool place.)
5. *Salicylic acid* 40 grains, extract of Indian hemp 5 grains, rectified spirit 2 drachms, collodion up to 1 oz. For removing corns and warts. ‘Corn solvents’ sold by chiropodists and chemists resemble this.

PLASTERS

1. *Adhesive or strapping*.—‘Rubber plaster’ for wounds, Leicester strapping for other purposes.
2. *Belladonna*.
3. *Mustard*.—These are sold in the form of squares of thin cloth spread with mustard. They require moistening with cold or tepid water; their action is very sharp, and one or two layers of folded handkerchief should be interposed between them and the skin.

A mustard plaster may be made by mixing equal quantities of mustard and flour and adding tepid water to form a paste, which is then spread on linen or brown paper. Place a layer of muslin between it and the skin.

FOMENTATIONS AND POULTICES

(See p. 153.)

Powder for Dusting Irritated Skin

Boracic acid and oxide of zinc, in fine powder, of each 1 part; starch, in powder, 2 parts.

Menthol Powder used as a Snuff

Menthol, dr. 1; boracic acid, dr. 2; chloride of ammonium, dr. 3.

PRESCRIPTIONS

1. Diaphoretic and Expectorant Mixture

(Given in the early stages of feverish attacks and bronchitis).

Ipecacuanha wine	. . . . .	℥ 10
Nitrate of potash	. . . . .	gr. 10
Solution of acetate of ammonia	. . . . .	dr. 2
Water	. . . . .	oz. 1

To be given every six hours.

2. Cough Mixture

(For vigorous persons with free expectoration)

Compound tincture of camphor	℥ 30
Ipecacuanha wine	℥ 10
Syrup of tolu	℥ 15
Glycerine	℥ 20
Water	oz. 1

To be given every six hours.

3. Cough Mixture

(For old persons with chronic bronchitis)

Carbonate of ammonia	gr. 5
Tincture of squills	℥ 15
Tincture of senega	dr. 1
Water	oz. 1

To be given every six hours.

4. Cough Linctus for Adults

(To soothe an irritable cough)

Tincture of opium	℥ 40
Dilute sulphuric acid	℥ 40
Spirits of chloroform	℥ 20
Treacle	dr. 2
Water	oz. 1

One *teaspoonful* when the cough is troublesome.

5. Cough Linctus for Children

Ipecacuanha wine	℥ 15
Bromide of potassium	gr. 10
Spirits of chloroform	℥ 15
Treacle	dr. 2
Water	oz. 1

Dose, *one teaspoonful* four times in the twenty-four hours.

6. Astringent Mixture

(For adults suffering from diarrhœa)

Tincture of opium	℥ 10
Tincture of catechu	℥ 30
Dilute sulphuric acid	℥ 15
Spirits of chloroform	℥ 10
Peppermint water	oz. 1

To be given every six hours.

7. Nux Vomica, Iron, and Quinine Tonic

Tincture of nux vomica	℥ 5
Citrate of iron and quinine	gr. 5
Spirits of chloroform	℥ 10
Water	oz. 1

To be taken three times a day after food.

8. Iron and Ammonia Tonic

Ammoniated citrate of iron	gr. 5
Sal volatile	℥ 20
Water	oz. 1

To be taken three times a day after food.

9. Aperient Iron Tonic

Tincture of perchloride of iron	℥ 10
Sulphate of magnesia	gr. 15
Glycerine	℥ 15
Infusion of quassia	oz. 1

To be taken three times a day after food.

10. Nux Vomica and Nitro-hydrochloric Acid Mixture

Tincture of nux vomica	℥ 5
Nitro-hydrochloric acid	℥ 10
Tincture of gentian	dr. 1
Water	oz. 1

To be taken three times a day after food.

11. Bismuth and Soda Mixture

Carbonate of bismuth	gr. 10
Bicarbonate of sodium	gr. 10
Mucilage	dr. 1
Peppermint water	oz. 1

To be given three times a day before food.

12. Rhubarb and Soda Mixture

Tincture of rhubarb	℥ 30
Bicarbonate of sodium	gr. 15
Peppermint water	oz. 1

To be given three times a day after food.

13. Rhubarb and Soda Powder

Powdered rhubarb	gr. 3
Bicarbonate of sodium	gr. 2
Powdered ginger	gr $\frac{1}{2}$

14. 'Soda-mint' Tabloids

Bicarbonate of sodium	.	.	.	.	.	gr. 4
Carbonate of ammonium	.	.	.	.	.	gr. $\frac{1}{8}$
Oil of peppermint	.	.	.	.	.	℥ $\frac{1}{8}$

15. Borax and Honey

Borax, dr. 1, in honey, oz. 1

HOUSEHOLD MEDICINES

The following medicines should be kept in every household. They can, with a few exceptions, be obtained in the form of 'tabloids,' which render scales and measures unnecessary. Plain printed labels should be affixed to every bottle, and poisonous¹ preparations should be kept separately, with a second label, bearing the word *Poison*, conspicuously printed on them.

<i>Opium</i> {	<i>Dover's Powder</i>	Compound rhubarb pills
	<i>Laudanum</i>	Sulphate of magnesia
	<i>Chlorodyne</i>	Seidlitz powders
	<i>Salicylate of soda</i>	Sal volatile
	<i>Phenacetin</i>	Glycerine
	Quinine	Castor oil
	<i>Calomel</i>	

For the Nursery

Ipecacuanha wine	<i>Mercury and chalk (grey) powder</i>
Rhubarb and soda powder	Fluid magnesia
'Soda-mints'	Lime-water (freshly made)

For External Use

Boracic acid	Boracic ointment
Permanganate of potash in crystals, or Condyl's fluid	Solution of subacetate of lead (dilute) 'Goulard Water'
Boracic, zinc, and starch powder	Mustard plasters

For Dressings

Boracic lint, and clean old linen	Adhesive strapping and plaster
'Gangee tissue,' or absorbent wool	Bandages
Oiled silk	

Utensils

Clinical and bath thermometers	Medicine glasses
Feeding-cup	Scales and weights
Bed-pan	Instruments mentioned p. 158
Higginson's syringe or a douche-can	

¹ Printed in italics.

For Travellers

Travellers are strongly advised to carry their medicines in the form of 'tabloids,' and disinfectants in pellets or 'soloids.' The quantities must necessarily depend on the number of persons composing the expedition and the country they intend to visit. Quinine should be taken in large quantities if the country is malarious. The douche-can may be used as a receptacle for instruments, &c.

<i>Laudanum</i>	Mustard plasters
<i>Chlorodyne</i>	Boracic lint
Quinine	'Gangee' tissue
Ipecacuanha powder	Roller bandages
<i>Calomel</i>	Adhesive plaster
Compound rhubarb pills	Oiled silk
Sulphate of magnesia	Clinical thermometer
Boracic acid	Metal douche-can
Permanganate of potash	Pasteur filter
Sulphate of zinc	Instruments mentioned p. 158
Vaseline	

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